ATM Installation, Upgrades, and Administration

Using Avaya MultiVantage™ Solutions

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Issue 5
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Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Preventing Toll Fraud

“Toll fraud” is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there may be a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

Avaya Fraud Intervention

If you suspect that you are being victimized by toll fraud and you need technical assistance or support, in the United States and Canada, call the Technical Service Center's Toll Fraud Intervention Hotline at 1-800-643-2353.

How to Get Help

For additional support telephone numbers, go to the Avaya Web site:

http:/www.avaya.com/support/

If you are:

- Within the United States, click *Escalation Lists*, which includes escalation phone numbers within the USA.
- Outside the United States, click *Escalation Lists* then click *Global Escalation List*, which includes phone numbers for the regional Centers of Excellence.

Providing Telecommunications Security

Telecommunications security (of voice, data, and/or video communications) is the prevention of any type of intrusion to (that is, either unauthorized or malicious access to or use of) your company's telecommunications equipment by some party.

Your company's “telecommunications equipment” includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, “networked equipment”).

An “outside party” is anyone who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf. Whereas, a “malicious party” is anyone (including someone who may be otherwise authorized) who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time-multiplexed and/or circuit-based) or asynchronous (character-, message-, or packet-based) equipment or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll-facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent)

Be aware that there may be a risk of unauthorized intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company (including but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs).

Responsibility for Your Company’s Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - Avaya’s customer system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources including but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure:

- Your Avaya-provided telecommunications systems and their interfaces
- Your Avaya-provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products.

Voice Over Internet Protocol (VoIP)

If the equipment supports Voice over Internet Protocol (VoIP) facilities, you may experience certain compromises in performance, reliability and security, even when the equipment performs as warranted. These compromises may become more acute if you fail to follow Avaya's recommendations for configuration, operation and use of the equipment. YOU ACKNOWLEDGE THAT YOU ARE AWARE OF THESE RISKS AND THAT YOU HAVE DETERMINED THEY ARE ACCEPTABLE FOR YOUR APPLICATION OF THE EQUIPMENT. YOU ALSO ACKNOWLEDGE THAT, UNLESS EXPRESSLY PROVIDED IN ANOTHER AGREEMENT, YOU ARE SOLELY RESPONSIBLE FOR (1) ENSURING THAT YOUR NETWORKS AND SYSTEMS ARE ADEQUATELY SECURED AGAINST UNAUTHORIZED INTRUSION AND (2) BACKING UP YOUR DATA AND FILES.

Standards Compliance

Avaya Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Avaya Inc. The correction of interference caused by such unauthorized modifications, substitution or attachment will be the responsibility of the user. Pursuant to Part 15 of the Federal Communications Commission (FCC) Rules, the user is cautioned that changes or modifications not expressly approved by Avaya Inc. could void the user’s authority to operate this equipment.

Product Safety Standards

This product complies with and conforms to the following international Product Safety standards as applicable:

Safety of Information Technology Equipment, IEC 60950, 3rd Edition including all relevant national deviations as listed in Compliance with IEC for Electrical Equipment (IECEE) CB-96A.

Safety of Information Technology Equipment, CAN/CSA-C22.2 No. 60950-00 / UL 60950, 3rd Edition

Safety Requirements for Customer Equipment, ACA Technical Standard (TS) 001 - 1997

One or more of the following Mexican national standards, as applicable: NOM 001 SCFI 1993, NOM SCFI 016 1993, NOM 019 SCFI 1998

The equipment described in this document may contain Class 1 LASER Device(s). These devices comply with the following standards:
EN 60825-1, Edition 1.1, 1998-01
21 CFR 1040.10 and CFR 1040.11.

The LASER devices operate within the following parameters:

- Maximum power output: -5 dBm to -8 dBm
- Center Wavelength: 1310 nm to 1360 nm

Luokan 1 Laserlaite
Klass 1 Laser Apparat

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposures. Contact your Avaya representative for more laser product information.

Electromagnetic Compatibility (EMC) Standards

This product complies with and conforms to the following international EMC standards and all relevant national deviations:

Limits and Methods of Measurement of Radio Interference of Information Technology Equipment, CISPR 22:1997 and EN55022:1998.

Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement, CISPR 24:1997 and EN55024:1998, including:

- Electrostatic Discharge (ESD) IEC 61000-4-2
- Radiated Immunity IEC 61000-4-3
- Electrical Fast Transient IEC 61000-4-4
- Lightning Effects IEC 61000-4-5
- Conducted Immunity IEC 61000-4-6
- Mains Frequency Magnetic Field IEC 61000-4-8
- Voltage Dips and Variations IEC 61000-4-11
- Powerline Harmonics IEC 61000-3-2
- Voltage Fluctuations and Flicker IEC 61000-3-3

Federal Communications Commission Statement

Part 15:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Part 68: Answer-Supervision Signaling. Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public switched network when:

- answered by the called station,
- answered by the attendant, or
- routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.

This equipment returns answer-supervision signals on all direct inward dialed (DID) calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered.
- A busy tone is received.
- A reorder tone is received.

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

This equipment complies with Part 68 of the FCC Rules. On the rear of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

REN is not required for some types of analog or digital facilities.

Means of Connection

Connection of this equipment to the telephone network is shown in the following table.

Manufacturer's Port Identifier	FIC Code	SOC/REN/ A.S. Code	Network Jacks
Off/On premises station	OL13C	9.0F	RJ2GX, RJ21X, RJ11C
DID trunk	02RV2-T	0.0B	RJ2GX, RJ21X
CO trunk	02GS2	0.3A	RJ21X
CO trunk	02LS2	0.3A	RJ21X
Tie trunk	TL31M	9.0F	RJ2GX
Basic Rate Interface	02IS5	6.0F, 6.0Y	RJ49C
1.544 digital interface	04DU9-BN, 1KN, 1SN	6.0F	RJ48C, RJ48M
120A2 channel service unit	04DU9-DN	6.0Y	RJ48C

If the terminal equipment (for example, the MultiVantage™ Solution equipment) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242-2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant.

It is recommended that repairs be performed by Avaya certified technicians.

The equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

This equipment, if it uses a telephone receiver, is hearing aid compatible.

Canadian Department of Communications (DOC) Interference Information

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

DECLARATIONS OF CONFORMITY

United States FCC Part 68 Supplier's Declaration of Conformity (SDoC)

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.

Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.

Copies of SDoCs signed by the Responsible Party in the U. S. can be obtained by contacting your local sales representative and are available on the following Web site:

http://support.avaya.com/elmodocs2/DoC/SDoC/index.jhtml/

All MultiVantage™ system products are compliant with FCC Part 68, but many have been registered with the FCC before the SDoC process was available. A list of all Avaya registered products may be found at:

http://www.part68.org/

by conducting a search using "Avaya" as manufacturer.

European Union Declarations of Conformity

CE

Avaya Inc. declares that the equipment specified in this document bearing the "CE" (*Conformité Europeénne*) mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive (1999/5/EC), including the Electromagnetic Compatibility Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC). This equipment has been certified to meet CTR3 Basic Rate Interface (BRI) and CTR4 Primary Rate Interface (PRI) and subsets thereof in CTR12 and CTR13, as applicable.

Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative and are available on the following Web site:

http://support.avaya.com/elmodocs2/DoC/IDoC/index.jhtml/

Japan

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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About This Book

This book provides procedures for installing ATM switches and upgrading an existing Avaya DEFINITY® Server to an Avaya MultiVantage™ on DEFINITY Server ATM-PNC or ATM-CES. It specifically covers:

- Installing a new Avaya DEFINITY Server that uses ATM-PNC
- Replacing the center stage switch (CSS), the central interface between the PPN and EPNs, with ATM-PNC
- Upgrading Release 6.3, Release 7, Release 8, Release 9, and Release 10 DEFINITY ATM-PNC to Avaya MultiVantage on DEFINITY ATM-PNC
- Adding ATM-CES
- Installing an ATM WAN spare processor (WSP).

The information in this book is intended for use by

- Avaya and channel partner trained field installation and maintenance personnel
- Technical Services Center (TSC) and Global Service Organization (GSO) personnel
- InterNetwork Systems (INS) engineers and technicians
- Sales and Design Support Center (SDSC) personnel
- Data Services Support Center (DSSC)
- Sales associates
- Avaya channel partners.

Overview

The Avaya MultiVantage on DEFINITY ATM (asynchronous transfer mode) combines portions of the Avaya DEFINITY Server with an ATM switch platform that meets specific criteria. DEFINITY ATM offers both *intraswitch* and *interswitch* ATM solutions. The intraswitch solution is called the ATM port network connectivity, or ATM-PNC, and the interswitch solution is called ATM circuit emulation service, or ATM-CES. ATM-PNC is only available on the R6.3r or later platform.

ATM-PNC provides an alternative to either the direct connect or center stage switch configurations for connecting the processor port network (PPN) to one or more expansion port networks (EPNs). ATM-PNC is available with four DEFINITY Server reliability options—standard, high, ATM network duplication, and critical. Customers must choose whether they want direct connect, CSS, or ATM-PNC. It is not possible to mix configurations in the same DEFINITY Server R.

ATM-CES lets the DEFINITY Server emulate an ISDN-PRI trunk on an ATM facility. These virtual trunks can serve as integrated access, tandem, or tie trunks. ATM-CES emulates up to 8 ISDN spans on a single OC-3/STM-1 ATM interface.

ATM wide area network (ATM-WAN) extends the port network connectivity beyond a single ATM switch over large distances. This allows you to use either a private ATM network, public WAN or a combination of both. Several networked ATM devices can be used as effectively as a single ATM switch for inter-port network connectivity.

The DEFINITY Server can connect through several ATM switch types, many of which are sold through Avaya's InterNetworking Systems (INS) channel, formerly know as DNS. Also, DEFINITY Servers are designed to work seamlessly with non-Avaya ATM switches that meet ATM standards set by the European Union.

For more information on Avaya ATM switches, go to the Avaya Inc. Web site (http://www.avaya.com) and click on Solutions, Products & Services > Products A-Z > DEFINITY® ATM Solutions. Examples include the following switches:

- Avaya M770 Multifunction Switch
- Avaya PacketStar AC 60 MultiService Media Gateway or PSAX1250 MultiService Media Gateway (access concentrators)

Organization

This book contains 6 chapters and 2 appendices:

- Chapter 1, ‘‘Preparing for Installation and Upgrades’’ describes the preparation necessary before an installation and upgrade, including
  - network design considerations, including SVCs generated and network impacts that can restrict ATM switch
  - interactions among various Avaya organizations to prepare the customer site for equipment, translations, and scheduling upgrades and new installations
  - calculating the suitability of various Avaya ATM switches.
- Chapter 2, ‘‘Installing a DEFINITY Server ATM-CES’’ provides a procedure for
  - hardware installation: ATM circuit packs and the ATM switch.
  - cabling (I/O connector, fiber optic cables).
- Chapter 3, ‘‘Installing a DEFINITY Server ATM-PNC’’ provides a procedure for
  - hardware installation: ATM circuit packs, T1 or E1 synchronization splitter, the ATM switch.
  - cabling (I/O connector, fiber optic cables)
  - ATM network duplication
  - WAN spare processor.
- Chapter 4, ‘‘Upgrading to ATM-PNC’’ describes the preparation and various upgrade paths for the following upgrades:
  - center stage switch to an Avaya MultiVantage on DEFINITY ATM-PNC
  - Release 6.3, Release 7, Release 8, , Release 9, and Release 10 Avaya DEFINITY ATM-PNC to Avaya MultiVantage ATM-PNC.
- Chapter 5, ‘‘Administering ATM-PNC and ATM-CES’’ provides the step-by-step procedures for administering
  - ATM port network connectivity (ATM-PNC)
  - ATM circuit emulation service (ATM-CES).
- Chapter 6, ‘‘Troubleshooting’’ describes troubleshooting scenarios and offers suggestions for isolating, fixing, and clearing DEFINITY Server alarms and errors for
  - DEFINITY Server administration
  - ATM-related synchronization
  - ATM switch administration.

- Appendix A, ‘‘Baselining the Customer’s Configuration’’ provides a worksheet to log the translations and administration information for
  - — DEFINITY Server configurations
  - — Lightwave interface units.
- Appendix B, ‘‘ATM Switch Feature Interactions’’ offers a quick-reference guide to the features supported and not supported and interactions among the DEFINITY Server’s features.

Conventions used in this book

Systems and circuit packs

- The word “system” is a general term encompassing all references to the Avaya DEFINITY Server R running Avaya MultiVantage Software.
- Circuit pack codes (for example, TN780 or TN2182B) are shown with the *minimum acceptable* alphabetic suffix (like the “B” in the code TN2182B).

  Generally, an alphabetic suffix higher than that shown is also acceptable. However, not every *vintage* of either the minimum suffix or a higher suffix code is necessarily acceptable. A suffix of “P” means that firmware can be downloaded to that circuit pack.
- The term “ASAI” is synonymous with the newer CallVisor ASAI.
- The term “cabinet” generally refers to the MCC1 (multi-carrier) cabinet.
- UUCSS refers to a circuit pack address in cabinet-carrier-slot order.

Typographic

Other terms and conventions might help you use this book.

- Commands are printed in bold face as follows: **command**.

  We show complete commands in this book, but you can usually type an abbreviated version of the command. For example, **list configuration station** can be typed as **list config sta**.
- Screen displays and names of fields are printed in constant width as follows: `screen display`.

  A screen is any form displayed on your computer or terminal monitor.
- Variables are printed in italics as follows: *variable*.
- Keys and buttons are printed as follows: KEY.
- To move to a certain field, you can use the TAB key, arrows, or the ENTER key (the ENTER key may appear as the RETURN key on your keyboard).

- If you use terminal emulation software, you need to determine what keys correspond to ENTER, RETURN, CANCEL, HELP, NEXT PAGE, etc.
- In this book we use the terms “telephone” and “voice terminal” to refer to phones.
- If you need help constructing a command or completing a field entry, remember to use HELP.
  - — When you press HELP at any point on the command line, a list of available commands appears.
  - — When you press HELP with your cursor in a field on a screen, a list of valid entries for that field appears.
- The status line or message line can be found near the bottom of your monitor display. This is where the system displays messages for you. Check the message line to see how the system responds to your input. Write down the message if you need to call our helpline.
- When a procedure requires you to press ENTER to save your changes, the screen you were working on clears and the cursor returns to the command prompt.

  The message line shows “`command successfully completed`” to indicate that the system accepted your changes.

Admonishments

Admonishments in this book have the following meanings:

CAUTION:
Denotes possible harm to software, possible loss of data, or possible service interruptions.

WARNING:
Denotes possible harm to hardware or equipment.

DANGER:
Denotes possible harm or injury to your body.

Physical dimensions

- Physical dimensions in this book are in inches (in.) followed by metric centimeters (cm) in parentheses.
- Wire gauge measurements are in AWG followed by the cross-sectional area in millimeters squared (mm^2) in parentheses.

How to get this book

On the Web

If you have internet access, you can view and download the latest version of this book. To view the book, you must have a copy of Acrobat Reader.

To access the latest version:

1. At your browser, go to the Avaya web site:

   http://www.avaya.com

2. Select **Support**.
3. Select **Online Services**.
4. Select **Documentation**.
5. Select **Recent Documents**.
6. Scroll down to find the latest release of DEFINITY or Avaya MultiVantage Software documents.
7. Search for the document number to view the latest version of the book.

Non-Web

This book and any other DEFINITY or Avaya MultiVantage Software books can be ordered directly from:

Globalware Solutions
200 Ward Hill Avenue
Haverhill, MA 01835 USA

+1-800-457-1235 (phone)
+1-800-457-1764 (fax)

Non-800 numbers:
+1 410-568-3680 (phone)
+1 410-891-0207 (phone)

How to get technical assistance

For additional support and trouble escalation:

1. At your browser, go to the Avaya web site:

   http://www.avaya.com

2. Select **Support**

3. If you are:
   - Within the United States, click *Escalation Lists*, which includes escalation phone numbers within the USA.
   - Outside the United States, click *Escalation Lists* then click *Global Escalation List*, which includes phone numbers for the regional Centers of Excellence.

If you do not have Web access, use the phone numbers below.

NOTE:
You may need to purchase an extended service agreement to use some of these resources. See your Avaya representative for more information.

Table 1. Avaya support

Support	Number
■ DEFINITY Helpline (for help with feature administration and system applications)	+1-800-225-7585
■ Avaya National Customer Care Center Support Line (for help with maintenance and repair)	+1-800-242-2121
■ Avaya Toll Fraud Intervention	+1-800-643-2353
■ Avaya Corporate Security	+1-800-822-9009 +1-925-224-3401
■ International Technical Assistance Center (ITAC)	+905-943-8801

For all international resources, contact your local Avaya authorized dealer for any additional help and questions.

Security

To ensure the greatest security possible for customers, Avaya Inc. offers services that can reduce toll-fraud liabilities. Contact your Avaya Inc. representative for more security information.

Login security is an attribute of the MultiVantage Software. Existing passwords expire 24 hours after installation.

For Access Security Gateway (ASG), see Appendix B, ‘‘Access Security Gateway’’.

Antistatic Protection

CAUTION:
When handling circuit packs or any components of a DEFINITY System, always wear an antistatic wrist ground strap. Connect the strap to an approved ground such as an unpainted metal surface on the DEFINITY System.

Remove/Install circuit packs

CAUTION:
When the power is on:

- *The control circuit packs cannot be removed or installed.*
- *The port circuit packs can be removed or installed.*

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Preparing for Installation and Upgrades

1

This chapter contains information on preparing for the installation or upgrade to Avaya MultiVantage™ software running on an Avaya DEFINITY® Server ATM Port Network Connectivity (ATM-PNC) and ATM Circuit Emulation Service (ATM-CES).

Common activities to either install or upgrade new ATM-PNCs or ATM-CESs include:

- Request Address Information
- Review Configuration and Equipment
- Determine ATM Switch Suitability
- Schedule Installation or Upgrade

Preparing for a DEFINITY Server ATM switch installation or upgrade involves coordinating the efforts among the following people and organizations:

- The customer
- The project manager
- NetCare® Professional Services (NPS)
- Avaya Technical Service Center (TSC) or Global Strategic Opportunities (GSO) Division
- ATM switch technician
- Avaya channel partner, if applicable

Request Address Information

The complete DEFINITY Server translations require precutover administration, which, in turn, requires a customer address scheme, specifically the ATM addresses for theTN2305X/TN2306X ATM interface circuit pack(s). The address of the EPN is automatically read by the local ATM switch, using the address registration procedure defined in Integrated Local Management Interface (ILMI). If field technicians do not have the login permissions required to obtain the EPN's ATM address(es) directly from the ATM switch(es), the customer or ATM switch installer must provide that information.

Review Configuration and Equipment

Figure 1-1 shows an example of the basic ATM connections for the DEFINITY Server R and DEFINITY Server CSI using ATM-PNC and ATM-CES. For more detailed connection diagrams of the reliability options, refer to ''DEFINITY Server configurations'' on page 1-9.

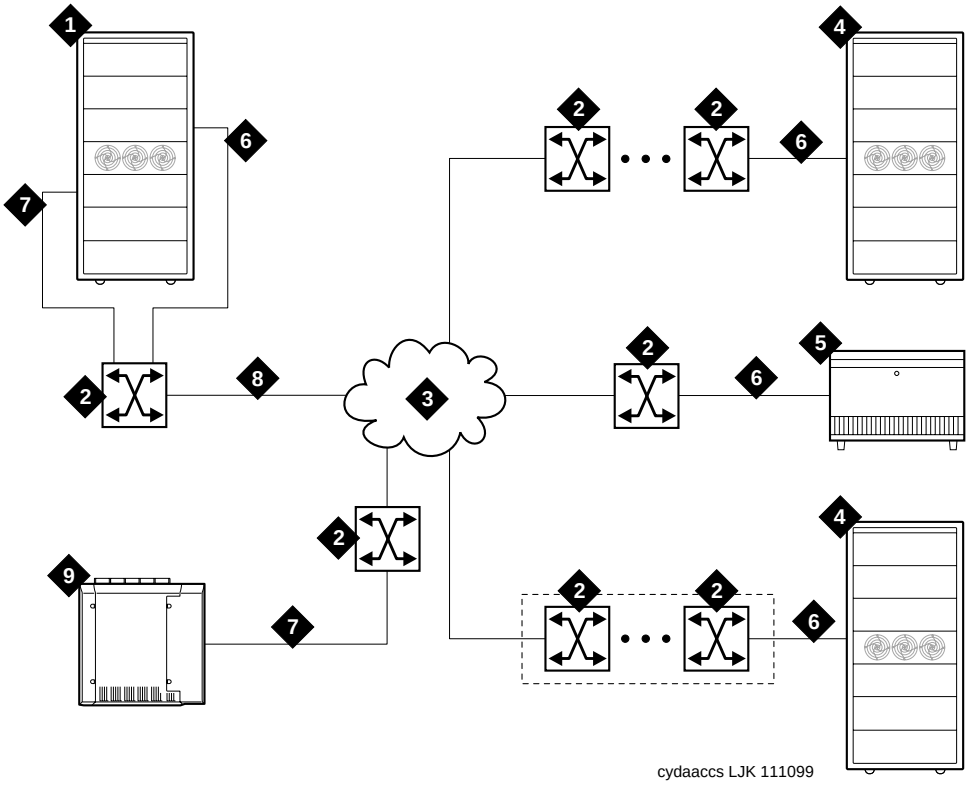

Figure Notes

1. DEFINITY Server PPN-1 (R)
2. Avaya ATM switch
3. ATM network (the cloud)
4. DEFINITY Server EPN in MCC1
5. DEFINITY Server EPN in SCC1
6. ATM-PNC
7. ATM-CES
8. ATM-PNC and ATM-CES
9. DEFINITY Server PPN-2 (CSI)

Figure 1-1. Example of an ATM-PNC and ATM-CES configuration

Required Hardware

Table 1-1 lists the required equipment for standard, high, critical reliability, and ATM network duplication configurations.

Table 1-1. Min. required equipment for Avaya MultiVantage ATM-PNC configurations

	Reliability level		
Equipment	**Standard**	**High**	**Critical/ATM Network Duplication**
ATM switch	1	1	2
TN2305X/TN230XB ATM interface[1] for each PN (see Redesigned ATM interface circuit packs)	1	2 (PPN) 1 (each EPN)	2
T1 or E1 synchronization splitter[2] (see Synchronization splitters)	1	1	1
SC-connected fiber optic cable (see)[3]	1	2 (PPN) 1 (each EPN)	2
TN771 maintenance/test circuit pack[4]			1

1. TN2305B (multimode fiber); TN2306B (single-mode fiber) for ATM-PNC. The B-suffix circuit pack is backward-compatible with, but does not replace the TN2305 or TN2306 circuit packs.
2. The number and uses of the synchronization splitter depend on the configuration and the source(s) from which primary and secondary synchronization is derived. You may need 1 sync splitter per ATM switch. DS1 synchronization requires either no sync splitter or up to a number twice the number of sites.
3. Existing fiber optic cable may require an ST-to-SC adapter, depending on the interface at the ATM switch. The TN2305X/TN2306X circuit pack requires an SC connector.
4. For network duplication; required for systems supporting PRI, BRI, or ASAI.

Redesigned ATM interface circuit packs

- The TN2305B and TN2306B circuit packs do not replace the TN2305 and TN2306 circuit packs, respectively. Either circuit pack can be used in all platforms, but the TN2305B or TN2306B is required for critical reliability with WAN Spare Processors (WSPs).
- You do not receive the TN2305B and TN2306B ATM interface circuit packs as automatic upgrades.

The redesigned TN2305B/TN2306B ATM interface circuit packs have more capabilities and resources:

- Firmware monitor port on the backplane of the circuit packs
- Spare lead for WSP applications
- Processor speed increased to 66 megahertz (MHz.)
- Increased hardware vintage bits
- ATM-network duplication

The increased functionality is available to both ATM-PNC and ATM-CES applications. However, both circuit packs can also function in systems designed and installed earlier than this release.

Firmware monitor port

Figure 1-2 shows the location of the firmware monitor port on the backplane of the circuit pack. You can attach a monitor cable to the ATM expansion circuit pack without removing the circuit pack from its carrier.

NOTE:
The TN2305/2306 circuit packs also have a firmware monitor header located on the circuit pack. This header functions the same as the redesigned backplane connector (Figure 1-2), but requires busying out and unseating the circuit pack to attach the monitor cable.

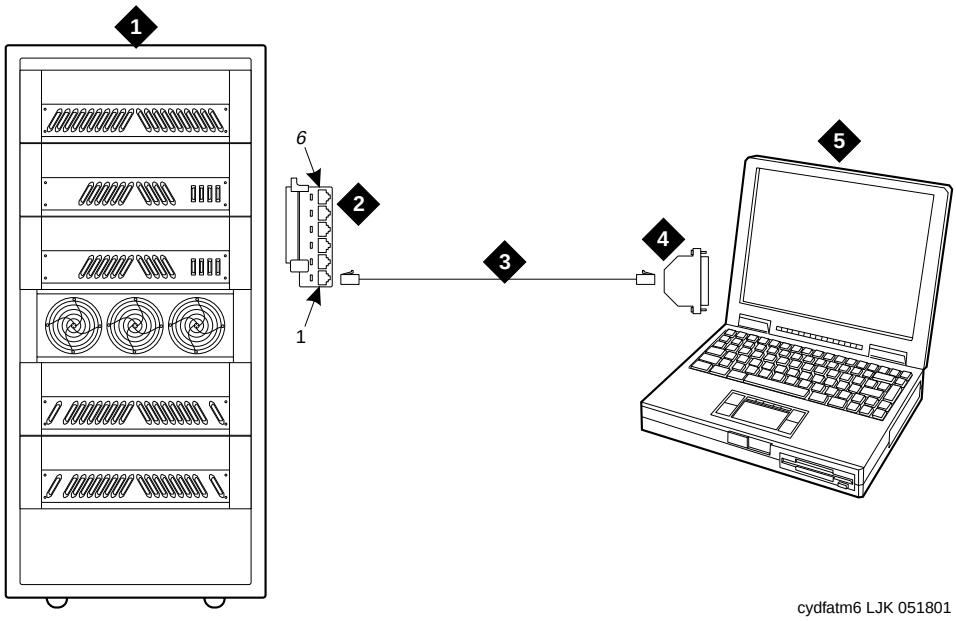

Figure Notes

1. DEFINITY Server
2. 258A 6-port Amphenol to RS-232 adapter (Comcode 102605136)
3. D8W (8-wire) cable
4. 355A RS-232 to 25-pin serial adapter (Comcode 407590785)
5. Laptop computer

Figure 1-2. TN2305B and TN2306B firmware monitor port

Use Figure 1-2 and the following procedure to access firmware monitor port *on the TN2305B or TN2306B circuit packs only*:

1. Connect the 258A 6-port Amphenol adapter to the port slot on the backplane corresponding to the TN2305B or TN2306B circuit pack.
2. Connect a D8W cable to port 1 of the 258A adapter.
3. Connect the other end of the D8W cable to the RS-232 side of the 355A adapter.
1. Connect the 25-pin serial connector on the 355A adapter to a serial port on the computer.
2. At the computer set the baud rate for the serial port to 38,400 (38.4K).

Spare lead

The spare lead allows the B-suffix ATM circuit packs to function seamlessly in the ATM WAN Spare Processor (WSP) application. It uses pin number 139 (AATOKEN) and is required in

- multicarrier cabinets (e.g., Avaya MCC1 Media Gateways)

  with

- Avaya MultiVantage software running on a DEFINITY Server R.

Processor speed increased

The circuit pack processor speed is 66 megahertz (MHz.)

Increased hardware vintage bits

The range of available hardware vintage bits is now 7, increasing the number of possible vintage values to 127.

ATM-network duplication

WAN spare processor is compatible with all Avaya DEFINITY Server reliability options for complete ATM-network duplication.

Synchronization splitters

To test the synchronization splitters, you need the following equipment:

- Phoenix 1541C Test Set with accessory cord kit
- Phoenix 5575A T1 Test Set with cord kit or equivalent
- 700A DS1 CPE Loopback Jack[1] (comcode 10798867)
- 103A block
- 1541CC cable kit
- RJ45-to-Bantam test cable from the 1541CC cable kit
- System capacities

Table 1-2 lists the maximum number of TN2305X/TN2306X circuit packs allowed in a DEFINITY Server.

1. See *Maintenance for Avaya MultiVantage and DEFINITY Server R*, Chapter 6, DS1 Loopback Test for more information.

Table 1-2. Maximum number of TN2305X/TN2306X circuit packs

Platform	Maximum ATM circuit packs allowed	Description
DEFINITY R	176	88 port networks (for CES) plus 88 port networks (for PNC)
SI, CSI, or C	6	CES only (no PNC)

Fiber-optic cable distances

The fiber-optic cable range is determined by the optical power budget and the fiber bandwidth. Table 1-3 shows the TN2305X/TN2306X specifications.

Table 1-3. TN2305X/TN2306X fiber-optic specifications

	Fiber mode		
Parameter	Multimode	Single mode	Units
Output optical power max	-14	-8	dBm average
Output optical power min (BOL/EOL)	-19/-20	-15	dBm average
Input optical power max	-14	-8	dBm average
Input optical power min	-30	-31/32.5/34	dBm average
Optical power budget	30-19=11	31-15=16	dBm
Typical range	-4	-20	Km
Typical wavelength	1310	1310	nm
Wavelength min/max	1261/1360	1261/1360	nm
Fiber width	62.5/125	62.5/125	um
Connector	Duplex SC	Duplex SC	
Loss per connector	0.2		dB
Fiber cable loss	1	0.5 max (0.33 typical)	dB/Km
Fiber bandwidth	500	10,000	MHz-Km
Reflections		28	dB
IEC 825/CDRH		Class 1 compliant	

Example

A multimode fiber using an optical power budget of 11 dB and a loss of 1 dB/Km with no connectors yields a distance of 11 Km, which is unrealistic. Using a fiber bandwidth of 500MHz-Km and using the ATM OC-3c symbol rate of 77.5 Mb/s (data rate 155 Mb/s) yields a distance of 6.4Km. In this case the distance is limited by the fiber bandwidth.

DEFINITY Server configurations

Figure 1-3, Figure 1-4 on page 1-11, and Figure 1-5 on page 1-12 show the ATM-PNC connections for standard, high, and critical reliability, respectively.

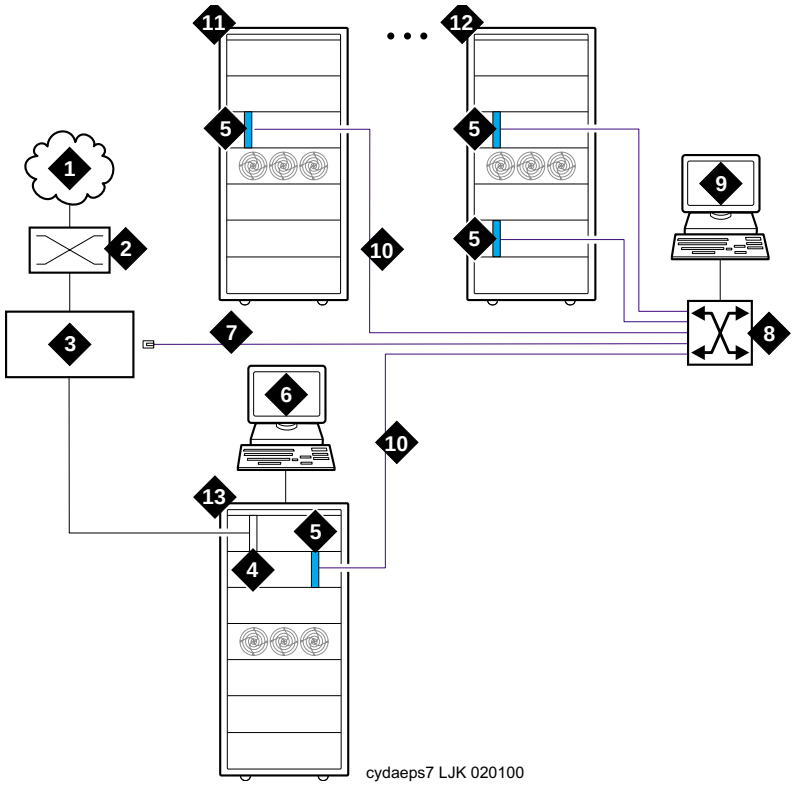

Figure Notes

1. T1/E1 sync source (public switched telephone network—PSTN)
2. Main distribution frame (MDF) or smart jack
3. Synchronization splitter.
4. DS1 circuit pack (TN464F)
5. TN2305X/TN2306X circuit packs
6. DEFINITY Server access terminal
7. Timing signal from synchronization splitter through an H600-383 cable to Avaya ATM switch
8. Avaya ATM switch (more than one ATM switch in an ATM-WAN configuration.)
9. ATM switch access terminal
10. Fiber optic cables from ATM OC-3/STM-1 interfaces
11. DEFINITY Server EPN
12. Split cabinet EPN
13. DEFINITY Server PPN

Figure 1-3. ATM-PNC connections for standard reliability

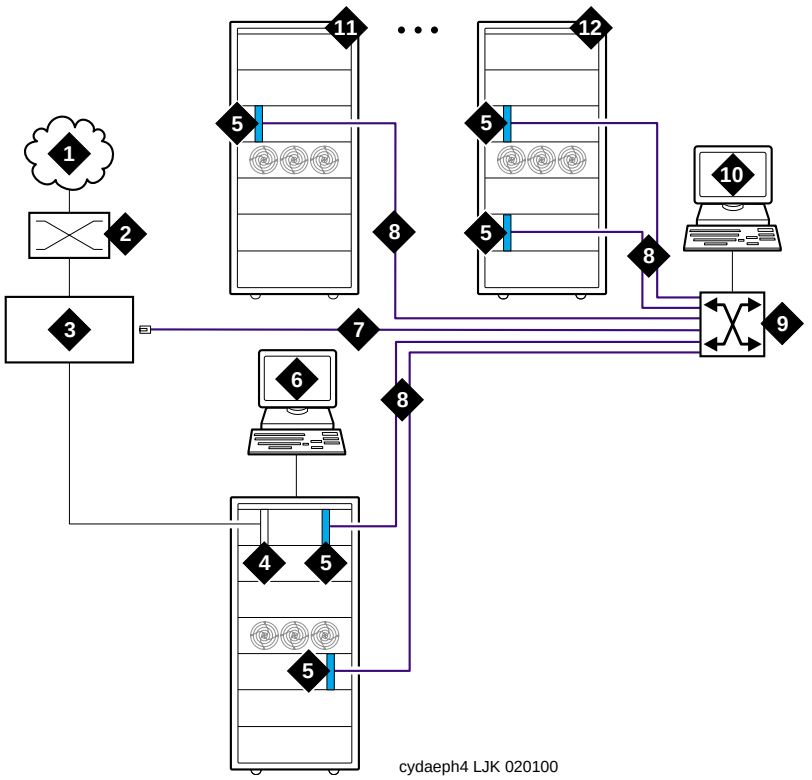

Figure Notes

1. T1/E1 sync source (public switched telephone network—PSTN)
2. Main distribution frame (MDF) or smart jack
3. Synchronization splitter
4. DS1 circuit pack (TN464F)
5. TN2305X/TN2306X circuit packs
6. DEFINITY Server access terminal
7. Timing signal from synchronization splitter through an H600-383 cable to Avaya ATM switch
8. Fiber optic cables to ATM OC-3/STM-1 interfaces
9. Avaya ATM switch (more than one ATM switch in an ATM-WAN configuration.)
10. ATM switch access terminal
11. DEFINITY Server EPN
12. Split-cabinet EPN

Figure 1-4. ATM-PNC connections for high reliability

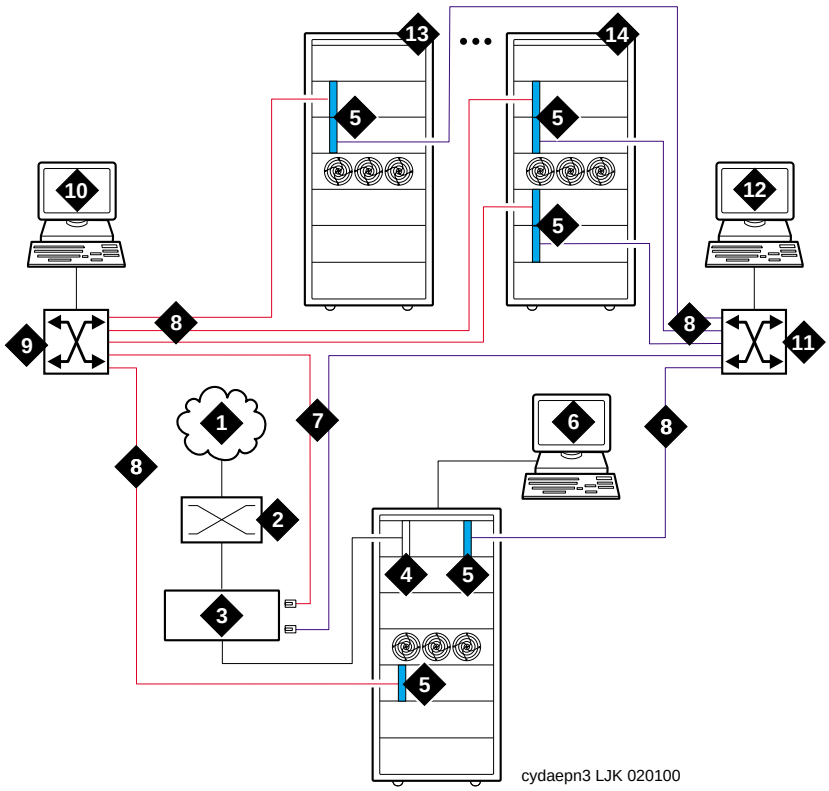

Figure Notes

1. T1/E1 sync source (public switched telephone network—PSTN)
2. Main distribution frame (MDF) or smart jack
3. Synchronization splitter[1]
4. DS1 circuit pack (TN464F)
5. TN2305X/TN2306X circuit packs
6. DEFINITY Server access terminal)
7. Timing signal from synchronization splitter through an H600-383 cable to Avaya ATM switch
8. Fiber optic cables to ATM interfaces
9. Avaya ATM switch B
10. ATM switch access terminal B
11. Avaya ATM switch A
12. ATM switch access terminal A
13. DEFINITY Server EPN
14. Split-cabinet EPN

[1]You could use 2 separate PSTN sync sources and 2 separate splitters for complete redundancy

Figure 1-5. ATM-PNC connections for critical reliability or ATM network duplication

Determine ATM Switch Suitability

To fully support DEFINITY Server ATM-PNC and provide nonblocking ATM access between all port networks, ATM switches must support at least 400 point-to-multipoint switched virtual connection (SVC) roots or leaves per OC-3/STM-1 interface. Because different switches have different limits—some limit roots, some leaves, and some the total, we have developed the Meiners' Algorithm to determine whether a switch can support a proposed set of port networks. Note that there are separate versions of the algorithm for Avaya M770 Multifunction switches and for other ATM switches. These algorithms are available to Avaya personnel as calculators within two Microsoft® Excel spreadsheets. Personnel with Avaya intranet access may find either of these MS Excel files at http://info.dr.avaya.com/~meiners/atm.html. Check periodically for updates.

The following directions only apply to the non-M770 version of the algorithm. (See the spreadsheets for further usage notes.) For best results, use the calculator for one ATM switch at a time. Use trial and error to set the values in the user-defined values section until the feasibility indicator reports **YES** or **PROBABLY**.

NOTE:
Use of this spreadsheet is no substitute for thinking. Please apply basic sanity checks to the outcome. ATM switches may have limitations that the calculator does not consider.

To use the calculator, type the network layout and resource limits for the ATM switch you are using. Refer to the following caveats as you input your information:

1. Not all ATM switches have limits on all of the values. If a limit does not apply, enter any very large number (1000000 is good).
2. Some ATM switches (for example, access concentrators) allow a limited ability to configure the limits. Other switches have fixed limits. If you do not know the limits, ask the ATM switch vendor.
3. If your ATM switch is handling non-DEFINITY traffic, enter the resource limits after subtracting the resources used by the non-DEFINITY traffic.
4. If you are using an ATM switch with different limits on different modules or ports (for example, an Avaya M770 Multifunction Switch):
    a. compute the average limits per port to which a DEFINITY port network is attached.
    b. select the port with the most restrictive limitations.
    c. enter the system limit as these limits times the number of DEFINITY port networks attached to that ATM switch.

NOTE:
The more partitioned the limits are, the less accurate are the results of the spreadsheet.

5. If you answer "yes" to transit traffic, the calculator may or may not be able to determine feasibility. If it cannot, the feasibility displays as **UNKNOWN**.

Table 1-4 shows an example of a calculation.

Table 1-4. Sample calculation

Network Layout	
Customer	***SV***
ATM switch	***M770***
Total number of DEFINITY port networks:	***20***
Number of PNs directly attached to this ATM switch:	***8***
Is the DEFINITY PPN directly attached to this ATM switch (yes/no)	***yes***
Number of trunks on this ATM switch (inter-ATM-switch connections)	***1***
Any transit traffic through this ATM switch (yes/no)	***no***
Aggregate peak phone calls rate per hour in all directly connected PNs	***10000***
Bidirectional aggregate trunk bandwidth in Mbps	***155.52***
Application bandwidth in kbps needed per port network	***128***
ATM Switch Resource Limits *(see "Limits" sheet for help)*	
Number of PP SVCs supported:	***1000000***
Number of PMP (roots) supported:	***4096***
Number of PMP parties (leaves) supported:	***1000000***
Number of PMP endpoints (roots+leaves) supported:	***1000000***
Total number of SVCs (PP+PMP) supported	***1000000***
Per-port SVC limit (normally based on VCI range)	***1000000***
Setups per second at <220 ms per setup	***1000000***
Feasibility	***YES***
Bandwidth limited	***1960 calls***

YES means that this application is okay under any load.

PROBABLY means that this application is okay under any reasonable loads. Check the constraint tests results to see what kind of loads might be a problem.

NO means that this application is not reasonable. See the Constraint Tests results to see what resource you are short of. See if you can increase this resource, or decrease the number of port networks.

UNKNOWN means that special engineering is required for this application because of the transit traffic. The special treatment is necessary because the feasibility depends on the volume of the transit traffic. Making any of the changes suggested for **NO** above might make it feasible regardless of the transit traffic.

BANDWIDTH LIMITED means that the aggregate trunk bandwidth is insufficient to support the theoretical maximum demand. Bandwidth-limited applications are not recommended unless you are certain that the requested call load will never exceed the available bandwidth. Make sure you are comfortable with the call limit for calls to nonlocal port networks (PNs).

Table 1-5. Constants

Timeslots per port network	500
Cache hit ratio	50%
EAL+PACL bandwidth	96

Table 1-6. Computed values

Number of nonlocal port networks	12
Effective number of port networks for PP	19
Effective number of port networks for PMP	16
Number of available timeslots	7920
Per-port SVCs (PP+PMP) needed	557
PP SVCs per PN	3
Total PP SVCs	57
PP cells per second required over trunks	13992
Aggregate cells per second available over trunks	353207
Bandwidth-limited maximum phone calls over trunks	1960
Timeslot-limited maximum phone calls over trunks	2000

Constraint tests

If your calculations do not yield a **YES**, this section provides the resources of which you are short. These tests check 9 ATM switch resource limitations against 6 different application scenarios. A 1 in the Test Results (Table 1-8 on page 1-16) indicates a passed test; a 0 indicates a failed test. To achieve a **YES** feasibility, all 54 tests must pass. To achieve a **PROBABLY**, only 27 tests (indicated in **bold**) must pass.

Table 1-7. Application scenarios

Number of 2-party calls	1980	0	0	0	0	990
Number of 3-party calls	0	880	0	0	0	220
Number of 4-party calls	0	0	495	0	0	61
Number of 5-party calls	0	0	0	316	0	19
Number of 6-party calls	0	0	0	0	220	14

Table 1-8. Test results

Constraint 1: Timeslots	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 2: PMP roots	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 3: PP	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 4: PMP leaves	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 5: PMP endpoints	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 6: Total SVCs	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 7: Per-port SVCs	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 8:Performance	**1**	**1**	*1*	*1*	*1*	**1**
Constraint 9:Trunk bandwidth	**1**	**1**	**1**	**1**	**1**	**1**

Final notes

The goal is to engineer the network so that in all reasonable applications, you always run out of DEFINITY Server time slots before running out of ATM switch resources. This is required to provide acceptable service to the customer.

These calculations factor in phone calls only. There is no specific accommodation for the ATM SVC cache, or for special features such as music, announcements, and group paging. The theory behind using 500 as the number of timeslots in a port network rather than the real number (484) is to allow for a normal amount of these special features. If you use multiple music on hold, group paging, and so forth, you may need special engineering.

This calculator determines that an application is **PROBABLY** feasible if it can handle reasonable activity mixes. The three columns in Table 1-8 that have bold entries define what is meant by reasonable. These tests require that the switch be able to handle a complete suite of 2-party calls, a complete suite of 3-party calls, and a mixed suite that involves some calls of each type. For best results, your application should pass all the constraint tests.

Any ATM switch that processes transit traffic (that is, connections that do not either originate or terminate on any of the port networks directly attached to it) may require special engineering. This is possible if the number of trunks on the ATM switch is more than one. If this is the case, the calculator first attempts to determine if the application is feasible despite the transit traffic. If it is, it reports the feasibility as **YES** or **PROBABLY**. If not, it reports the feasibility as **UNKNOWN**, requiring special engineering.

Known limits of commonly used ATM switches

Use the limits shown in Table 1-9 to do your own calculations. To make it easier as you use the calculator, we suggest that you

1. Select and copy the values from the table in the spreadsheet.
2. Select the values on the sample calculation.
3. Select **Edit > Paste Special** with the transpose option to paste the values into the calculator.

NOTE:
These limits are the best we could determine at one time. For each switch, the example shown is generally the best you can do, assuming you bought the maximum configuration and you administered it optimally for DEFINITY (which are not necessarily the default settings). Consult the switch vendor for confirmation of current limits.

A limit shown as 1000000 means that this ATM switch has no independently defined limit on this resource.

Table 1-9. Known limits of commonly used ATM switches

Switch	Number of PP SVCs supported	Number of PMP (roots) supported	Number of PMP parties (leaves) supported	Number of PMP endpoints (roots + leaves) supported	Total number of SVCs (PP+PMP) supported	Per-port SVC limit (normally based on VCI range)	Setups/s at <220 s/set up
Avaya PacketStar PSAX 1250							
Release 5.0	1000000	1000000	1000000	1000	1000000	1000000	1000000
Release 5.1	1000000	1000000	1000000	4000	1000000	1000000	1000000
Release 6 (with recommended admin)	400	5000	6666	1000000	1000000	1000000	1000000

Continued on next page

Table 1-9. Known limits of commonly used ATM switches (Continued)

Avaya M770 Multifunction r2							
Dual Domain Modules 1&8	1000000	4096	1000000	1000000	1000000	1000000	1000000
Dual Domain Modules 2-7&9-14	1000000	2048	1000000	1000000	1000000	1000000	1000000
Single Domain	1000000	1024	1000000	1000000	1000000	1000000	1000000
Dual Domain	1000000	4096	1000000	1000000	1000000	1000000	1000000
Fore ASX1000							
Release 6 (with memory model 5)	2048	2048	16384	1000000	1000000	1000000	1000000

Schedule Installation or Upgrade

Schedule the installation or upgrade with the Avaya Technical Support Organization (TSO) and NetworkCare® Professional Services (NPS).

Installing a DEFINITY Server ATM-CES

2

This chapter describes the procedures for installing a new Avaya MultiVantage™ software running on an Avaya DEFINITY® Server ATM-CES The procedure is simple in that you install the DEFINITY Server, then install the ATM switch and the TN2305X/TN2306X interface circuit packs. Making it an ATM-CES is done administratively (refer to Chapter 5, "Administering ATM-PNC and ATM-CES").

NOTE:
ATM-CES works only with TN2305X/TN2306X ATM interface circuit packs.

Equipment Installation

To prepare for a new Avaya MultiVantage™ on DEFINITY ATM-CES installation, you need to install the DEFINITY Server first. For instructions on installing a DEFINITY Server or an Avaya™ S8100 Media Server, refer to the following installation books or online information:

- *DEFINITY Made Easy* (online at the URL: *http://made-easy.avaya.com*)
- *Installation, Upgrades, and Additions for Avaya CMC1 Media Gateway*
- *Installation and Upgrades for the Avaya S8100 Media Server with the Avaya G600 and CMC1 Media Gateways*

Review the reliability configurations for Avaya DEFINITY Server ATM (refer to Figure 1-3 on page 1-10 through Figure 1-5 on page 1-12).

The slot restrictions for a CES configuration are similar to ISDN-PRI circuit packs. In PPNs and EPNs, ATM interface circuit packs can occupy any available slot in a port carrier.

Follow the steps in Table 2-1 to ensure that

- the applicable equipment is installed correctly.
- the customer's configuration is properly recorded (use worksheet in Appendix A, "Baselining the Customer's Configuration").

Table 2-1. General installation process

√	Step	Action	Description
	1.	Install DEFINITY Server	Refer to the appropriate installation book for your platform See "DEFINITY Server configurations" on page 1-9 for connection schematics.
	2.	Install ATM switch(es) or access concentrators	Refer to your ATM switch's quick reference guide. To get a copy of the quick reference guide, go to the Avaya web site (http://www.avaya.com), click on Support , and then find the page for your Avaya ATM solution.
	3.	Install ATM interface circuit pack	Insert the TN2305X/TN2306X circuit pack(s) into the appropriate slot(s).
	4.	Route the fiber optic cables between the ATM switch and the DEFINITY Server PPN and EPNs.	Follow the fiber pass-through procedure in the appropriate DEFINITY Server installation book. **WARNING:** *Be sure that the fiber optic cable is secured so that the door of the DEFINITY ECS switch does not pinch or bend the cable.* For csi platforms, see "NAA1 Fiber Optic Circuit Pack (csi models only)" on page 2-3 for a diagram of the NAA7 board that routes fiber optic cabling from the back of the switch to the front.
	5.	Connect the fiber optic cables	Connect the fiber optic cables to the ATM switch. **NOTE:** If the installation uses the customer's existing fiber, you may need an ST-to-SC adapter (1 included in Fiber Pass-Through Kit).

Continued on next page

Table 2-1. General installation process (Continued)

√	Step	Action	Description
	6.	Connect the fiber optic cables to the ATM interface circuit packs	Connect fiber optic cable to the SC connector on the faceplate of each TN2305X/TN2306X circuit pack in the DEFINITY Server PPN and EPN. ■ The TN2305X/TN2306X circuit pack interface requires SC connectors (see Note in Step 5). ■ Do not reuse existing fiber cabling with ST connectors at both the DEFINITY Server and the ATM switch. This requires an ST-to-SC adapter at both ends. It is better to order the cable with the SC connectors at both ends.
	7.	Record configuration	Record DEFINITY Server switch-to-ATM port (port locations for each ATM circuit pack) in Table A-1 in Appendix A, "Baselining the Customer's Configuration".
	8.	Record fiber connections	Record the fiber optic cable runs on the lightwave interface (LIU) diagram (Figure A-1 in Appendix A, "Baselining the Customer's Configuration").

NAA1 Fiber Optic Circuit Pack (csi models only)

The NAA1 board routes fiber optic connections from the rear of the cabinet through the front faceplate. The SC fiber connectors that go through the faceplate connect to the faceplate connectors on the TN2305X/TN2306X ATM circuit pack.

Unpack and Inspect

1. Verify that the equipment is received. See Figure 2-1 on page 2-4. Actual equipment may vary in appearance and may ship in separate packages.
2. See Table 2-2 on page 2-5 for a list of part Comcodes.

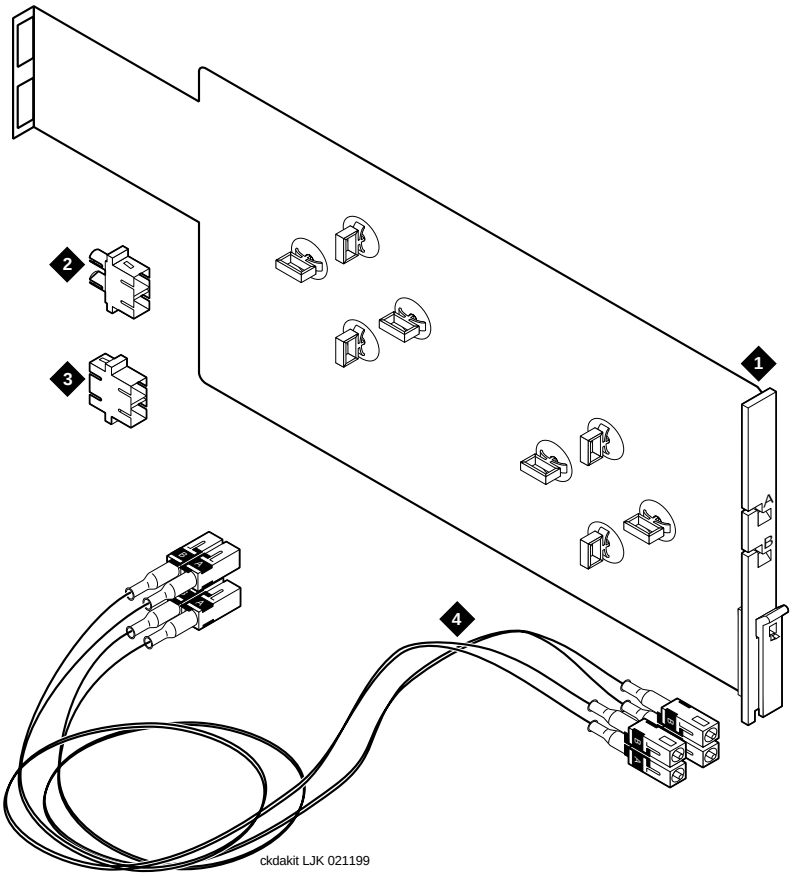

Figure Notes

1. NAA1 circuit pack
2. SC/ST connectors (2x)
3. SC/SC connectors (2x)
4. Fiber cables (2 orange multimode cables for use with the TN2305X circuit pack and 2 yellow single mode cables for use with the TN2306X circuit pack)

Figure 2-1. NAA1 Fiber Optic Interface Kit Equipment

Table 2-2. Parts List

Quantity	Description	Comcode
1	Fiber optic interface kit Kit includes: NAA1 circuit pack, 2 SC/SC connectors, 2 SC/ST connectors, and 4 cables (2 for single mode and 2 for multi-mode).	108424391

Installation Instructions

Complete this steps after the TN2305X/TN2306X circuit pack is installed.

1. Insert the connector into the top opening at the rear of the NAA1 circuit pack. See Figure 2-2 on page 2-6.
2. Attach either the single mode (yellow) cable or multimode (orange) cable to the connector.
3. Route the cable through the slot A in the faceplate.
4. Determine how much of the cable is needed to reach the ATM circuit pack.
5. Wrap the excess cable as shown in Figure 2-2 on page 2-6 and secure with the clips.
6. Repeat these steps for each circuit pack used.

   NOTE:
   In Step 1, use the bottom opening at the rear of the NAA1 circuit pack.
   In Step 3, use slot B in the faceplate.
   In Step 5, use the lower set of clips to secure the excess cable.

7. Insert the NAA1 circuit pack into slot 11 on the top row of the compact modular cabinet.

   CAUTION:
   Do not attempt to put this circuit pack into any other slot as pin damage may occur.

8. Route the cable(s) to the TN2305X/TN2306X circuit pack(s) and connect them.

   NOTE:
   The loop formed by the cable connecting the two circuit packs must have a minimum radius of 1 in. (2.54 cm). If not, adjust the cable or move the circuit pack(s) to another location.

9. Connect the other equipment into the connector(s) at the rear of the NAA1 circuit pack.

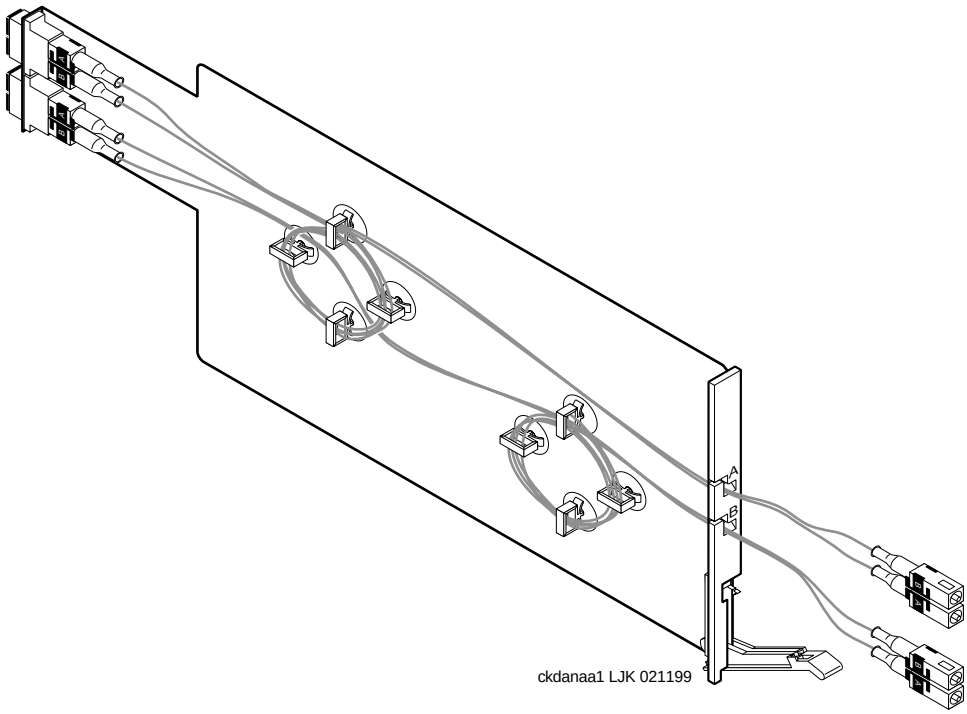

Figure 2-2. NAA1 Circuit Pack with Cables Attached

Installing a DEFINITY Server ATM-PNC

3

This chapter describes the procedures for installing a new Avaya MultiVantage™ on a DEFINITY® Server ATM system. The process includes

- Installing Equipment
- Installing and Testing Network Synchronization
- Setting Up ATM Network Duplication
- Installing a WAN Spare Processor

Installing Equipment

If the ATM switch and interface circuit packs are already installed, then the actual upgrade to ATM-PNC is done administratively in Chapter 5, "Administering ATM-PNC and ATM-CES".

To prepare for a new DEFINITY Server ATM installation refer to the following:

- *DEFINITY Made Easy* (online at URL: http://made-easy.avaya.com)

Review the reliability configurations for Avaya DEFINITY Server ATM (refer to Figure 1-3 on page 1-10 through Figure 1-5 on page 1-12) and determine the synchronization sources (DS1, E1, or ATM network).

Slot restrictions for an ATM interface circuit packs are similar to expansion interface circuit packs:

- PPN: ATM interface circuit packs used for ATM-PNC must occupy the slots labeled EXPANSION INTERFACE.
- EPNs: ATM interface circuit packs used for ATM-PNC can occupy slot 1 (and 2, if duplicated) on carrier A, and also slot 2 (and 3, if duplicated) on carrier B

Follow the steps in Table 3-1 to ensure that

- the applicable equipment is installed correctly.
- the customer's configuration is properly recorded (use worksheet in Appendix A, "Baselining the Customer's Configuration").

Table 3-1. General installation process

√	Step	Action	Description
	1.	Install DEFINITY Server	Refer to the appropriate installation book See "DEFINITY Server configurations" on page 1-9 for connection schematics.
	2.	Install ATM switch(es) or access concentrators	Refer to your ATM switch's quick reference guide. To get a copy of the quick reference guide, go to the Avaya web site (http://www.avaya.com), click on Support, and then find the page for your Avaya ATM solution.
	3.	Check the distances from the ATM switch to the DS1 timing source	Use the information in Table 3-3 on page 3-14 to determine the maximum cable run lengths for the configuration for more information.
	4.	Install ATM interface circuit pack	Insert the TN2305/TN2306 circuit pack(s) into the appropriate slot(s).
	5.	Route the fiber optic cables between the ATM switch and the DEFINITY Server PPN and EPNs.	Follow the fiber pass-through procedure in the appropriate installation book. **WARNING:** *Be sure that the fiber optic cable is secured so that the door of the DEFINITY Server does not pinch or bend the cable.*
	6.	Connect the fiber optic cables	Connect the fiber optic cables to the ATM switch. **NOTE:** If the installation uses the customer's existing fiber, you may need an ST-to-SC adapter (1 included in Fiber Pass-Through Kit).

Continued on next page

Table 3-1. General installation process (Continued)

√	Step	Action	Description
	7.	Connect the fiber optic cables to the ATM interface circuit packs	Connect fiber optic cable to the SC connector on the faceplate of each TN2305/TN2306 circuit pack in the DEFINITY Server PPN and EPN. ■ The TN2305/TN2306 circuit pack interface requires SC connectors (see Note in Step 5). ■ Do not reuse existing fiber cabling with ST connectors at both the DEFINITY Server and the ATM switch. This requires an ST-to-SC adapter at both ends. It is better to order the cable with the SC connectors at both ends.
	8.	Record configuration	Record DEFINITY Server switch-to-ATM port (port locations for each ATM circuit pack) in Table A-1 (in Appendix A, "Baselining the Customer's Configuration"). **NOTE:** Read the MAC addresses from the ATM switch (refer to your ATM switch's quick reference guide) and record them in Table A-1.
	9.	Record fiber connections	Record the fiber optic cable runs on the lightwave interface (LIU) diagram (Figure A-1) in Appendix A, "Baselining the Customer's Configuration".
	10.	Install and test synchronization splitter, if required.	Follow the procedures for installing and testing the synchronization splitter and the T1 or E1 timing source in "Installing and Testing Network Synchronization" on page 3-4.

Installing and Testing Network Synchronization

An Avaya MultiVantage on DEFINITY Server ATM-PNC requires network synchronization for DS1 circuit packs not to slip relative to the LEC/IXC switches. The ATM switch serves as the sync reference source for the DEFINITY Server. The ATM switch, in turn, derives primary and secondary sync. To accomplish this, the most common option is to use synchronization expanders (splitters).

Connections without synchronization splitters

In some configurations the ATM switches are traced to network clocks through their SONET/SDH interfaces, not requiring any synchronization splitters. However, the ATM switch could require a single splitter if only one of the sync sources is derived from the network.

The ATM switches may obtain their network synchronization as follows:

- The ATM switch gets its network timing reference from its SONET/SDH/SDIT interface to that network.
- Or if the customer wants to use a DS1 source for network synchronization that also happens to be a DEFINITY Server switch trunk, then one sync splitter is necessary to send a copy of that DS1 signal to the ATM switch. The DS1 circuit pack is only an indirect timing reference for the DEFINITY Server.

Connections needing synchronization splitters

If the ATM network does not provide a synchronization expander (splitter), then the ATM configurations may require one that takes a DS1 T1 or E1 signal and redirects it to the

- ATM switch(es), depending on configuration and duplication
- DEFINITY Server through the DS1 circuit pack

This creates a single synchronization source.

Check the customer's configuration carefully so that you can

- Connect the hardware correctly during installation
- Properly administer the synchronization plan later (Chapter 5, ''Administering ATM-PNC and ATM-CES'')

This section covers the synchronization installation and test process.

- Splitter descriptions—Describes the splitter's inputs and outputs
- Synchronization splitter connections—Connection diagrams for timing connections through a DSU/CSU (Figure 3-6 on page 3-11) and an ICSU (Figure 3-7 on page 3-12)
- Verify the DS1 service—Checks for presence of the DS1 T1 or E1 timing source and the general health of the DS1 circuit pack.
- Installing and testing the splitter provides the following information
  - Splitter port tests (401A/402A only)
  - Installing a 400A T1 splitter
  - Installing 401A, 402A, or 403A splitters

Installing and testing the synchronization splitter involves interrupting the DS1 signal provided by the service provider. Even though the DS1 circuit pack should be down less than 5 minutes, before removing a working T1/E1 span, contact the service provider. Failure to notify the T1/E1 service provider may result in:

- *The service provider looping the T1/E1 span back to the subscriber.*
- *A span alarm being detected at the central office and the span being taken out of service, sending an AIS (blue Alarm) to the DEFINITY Server. The synchronization signal is necessary for testing equipment and connections.*

Splitter descriptions

Table 3-2 describes the 4 splitter models and their capabilities. The drawings show the splitters and their connection points. Figure 3-5 on page 3-10 shows a schematic of the 2 jumper sets and their connections for 401A, 402A, and 403A sync splitters.

Table 3-2. Synchronization splitter models and attributes

Model	T1/E1	Impedance	Comcode	Drawing	Description/Application
400A	T1	100 Ω	108217795	Figure 3-1	No ICSU capability
401A	T1	100 Ω	108508078	Figure 3-2	Limited ICSU capability
402A	E1	120 Ω	108508094	Figure 3-3	
403A	E1	75 Ω	108508102	Figure 3-4	

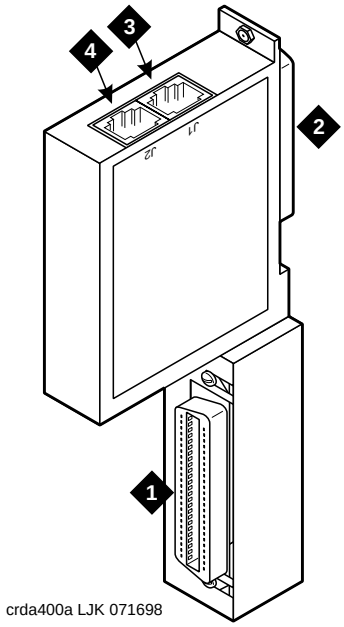

Figure Notes:

1. From network interface
2. Amphenol connection to DEFINITY Server
3. Timing output port (J1) to the ATM switch[1]
4. Timing output port (J2) to the ATM switch[1]

1. Ports J1 and J2 provide identical DS1 timing source signals to the ATM switches. The ATM switch can use two separate DS1 timing signals (one at a time from two separate spans).

Figure 3-1. 400A synchronization splitter

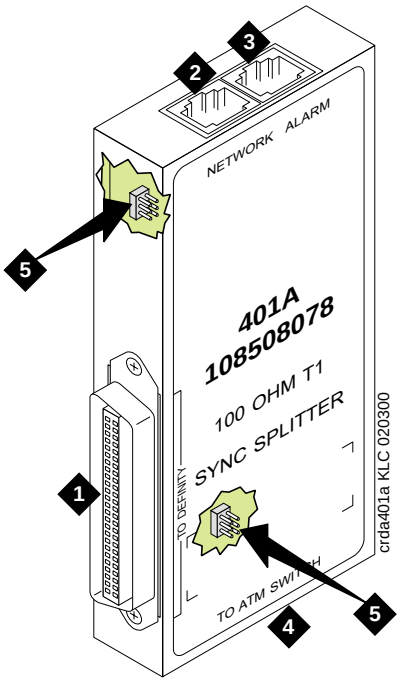

Figure Notes:

1. Amphenol connector to DEFINITY Server
2. Network timing connection
3. Timing alarm lead connection
4. Timing output ports (RJ45) to ATM switch[1]
5. Jumpers and capacitors (inside case). See Figure 3-5 on page 3-10 for settings.

1. Ports J1 and J2 provide identical DS1 timing source signals to the ATM switches. The ATM switch can use two separate DS1 timing signals (one at a time from two separate spans).

Figure 3-2. 401A synchronization splitter

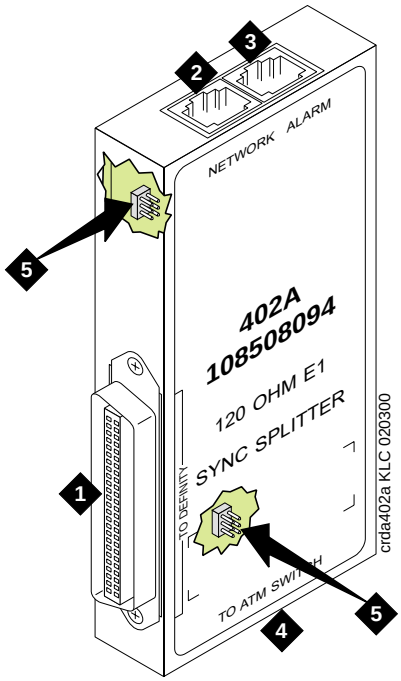

Figure Notes:

1. Amphenol connector to DEFINITY Server
2. Network timing connection
3. Timing alarm lead connection
4. Timing output ports (RJ45) to ATM switch[1]
5. Jumpers and capacitors (inside case). See Figure 3-5 on page 3-10 for settings.

1. Ports J1 and J2 provide identical DS1 timing source signals to the ATM switches. The ATM switch can use two separate DS1 timing signals (one at a time from two separate spans).

Figure 3-3. 402A synchronization splitter

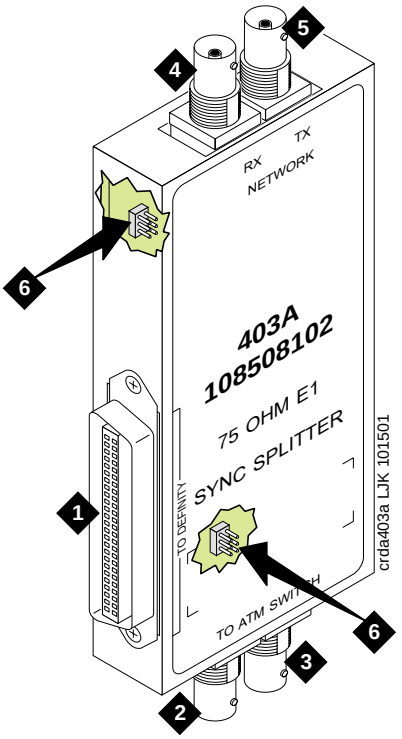

Figure Notes:

1. Amphenol connector to DEFINITY Server
2. Synchronization source (timing output ports) to ATM switch[1]
3. Synchronization source (timing output ports) to ATM switch[1]
4. Network receive connection, BNC connector
5. Network transmit connection, BNC connector
6. Jumpers and capacitors (inside case). See Figure 3-5 on page 3-10 for settings.

1. These are identical DS1 timing source signals to the ATM switches. The ATM switch can use two separate DS1 timing signals (one at a time from two separate spans).

Figure 3-4. 403A synchronization splitter

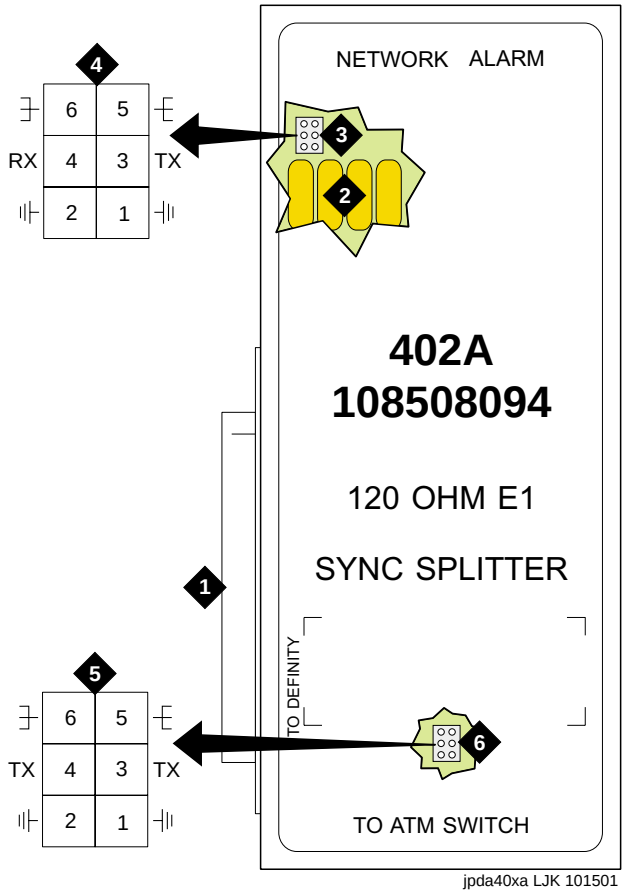

Figure Notes:

1. Amphenol connection to DEFINITY Server switch
2. Row of capacitors
3. Jumpers for incoming network connections
4. Incoming network transmit and receive connections
5. Jumper 1-2 = true ground
   Jumper 5-6 = shield grounded
   Jumper 3 = TX cable ground
   Jumper 4 = RX cable ground
   Default connections = 1-2, 3-5
6. True ground
7. Cable shield grounded
8. Jumper 1-2 = true ground
   Jumper 5-6 = shield grounded
   Jumper 3 = ATM switch A TX cable ground
   Jumper 4 = ATM switch B TX cable ground
   Default connections = 3-5, 4-6
9. Output jumpers
10. Timing output to ATM switch A
11. Timing output to ATM switch B

Figure 3-5. Jumper settings (401A/402A/403A)

Synchronization splitter connections

The splitter connects to a timing source. Figure 3-6 shows the synchronization connections through a DSU/CSU (400A), and Figure 3-7 on page 3-12 shows the synchronization connections through an ICSU (400A). Figure 3-8 on page 3-13 shows the synchronization connections directly to the timing source (401A, 402A, 403A).

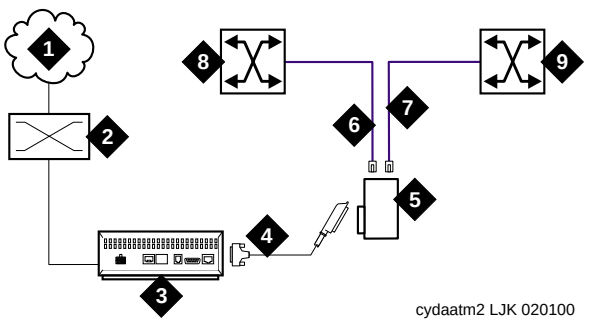

Figure Notes:

1. Public Switched Telephone Network (PSTN)
2. Main distribution frame (MDF) or smart jack.
3. Channel service unit (CSU)
4. H600-307-GR2 cable
5. 400A T1 (100 Ω) splitter connects to the DEFINITY Server
6. H600-383 quad cable from sync splitter to ATM switch A
7. H600-383 quad cable from sync splitter to ATM switch B (critical reliability/ATM network duplication)
8. Avaya ATM switch A
9. Avaya ATM switch B (critical reliability/ATM network duplication)

Figure 3-6. Synchronization connections through an external DSU/CSU (400A)

Use the information in Table 3-3 on page 3-14 to determine the maximum cable run lengths for the configuration.

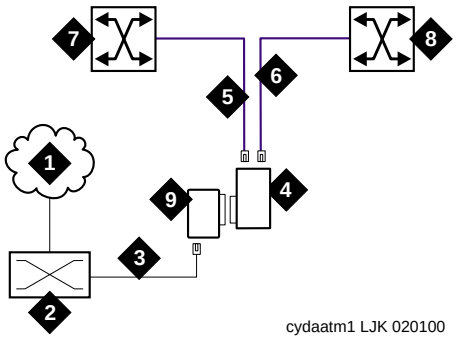

Figure Notes:

1. Public Switched Telephone Network (PSTN)
2. Main Distribution Frame (MDF) or smart jack
3. H600-383 quad cable
4. 400A T1 (100 Ω) splitter connected to DEFINITY Server
5. H600-383 quad cable from sync splitter to ATM switch A
6. H600-383 quad cable from sync splitter to duplicated ATM switch B (critical reliability)
7. Avaya ATM switch A
8. Avaya ATM switch B (critical reliability/ATM network duplication)
9. ICSU

Figure 3-7. Synchronization connections through an ICSU (400A)

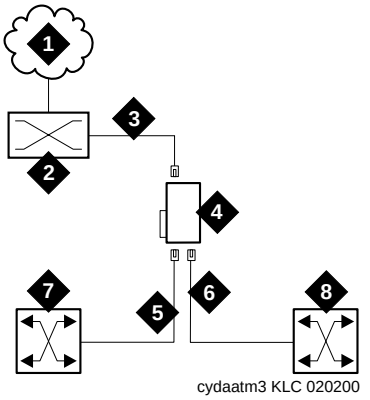

Figure Notes:

1. Public switched telephone network (PSTN)
2. Main distribution frame (MDF) or smart jack
3. H600-383 quad cable
4. 401A T1 (100 Ω) splitter, 402A E1 (120 Ω) splitter, or 403A E1 (75 Ω) splitter connected to DEFINITY Server
5. H600-383 quad cable from sync splitter to ATM switch A
6. H600-383 quad cable from sync splitter to duplicated ATM switch B (critical reliability/ATM network duplication)
7. Avaya ATM switch A
8. Avaya ATM switch B (critical reliability/ATM network duplication)

Figure 3-8. Synchronization connections directly to timing source (401A/402A/403A)

Use the information in Table 3-3 to determine the maximum cable run lengths for the configuration.

Table 3-3. Maximum cable lengths

Splitter	Used in	Cable	Maximum distance from splitter to ATM switch
400A T1 100 Ω	North America (USA and Canada)	H600-383[1] shielded twisted pair	130 feet 43 meters
401A T1 100 Ω	North America (USA and Canada)	H600-383[1] shielded twisted pair	1310 feet[2] 393 meters
402A E1 120 Ω	See Table 3-4 on page 3-15	120-Ω shielded twisted pair	1000 feet[2] 305 meters
403A E1 75 Ω	See Table 3-4 on page 3-15	75-Ω coaxial	1000 feet[2] 305 meters

1. Must have RJ45 connectors on each end.
2. The loss allowed in the cable is 6 dB. Typical cables have losses of 0.6 dB/100 ft; hence, 1000 feet may be considered a typical distance. Distance varies if cables with different losses are used.

Table 3-4 lists the splitter model(s) applicable to specific countries.

Table 3-4. Country-specific splitter applications

Country	Splitter model		
	400A/401A T1 100 Ω	**402A E1 120 Ω**	**403A E1 75 Ω**
Argentina			Y
Australia		Y	
Austria		Y	Y
Bahrain		Y	Y
Belgium		Y	Y
Brazil			Y
Canada	Y		
China			Y
Columbia			Y
Denmark		Y	Y
Egypt		Y	Y
Finland		Y	Y
France		Y	Y
Germany		Y	Y
Hong Kong		Y	
India		Y	Y
Indonesia		Y	Y
Ireland		Y	Y
Italy		Y	Y
Japan[1]			
Korea		Y	Y
Luxembourg		Y	Y
Malaysia		Y	Y
Mexico			Y
Netherlands		Y	Y
New Zealand		Y	Y
Norway		Y	Y

Continued on next page

Table 3-4. Country-specific splitter applications (Continued)

Country	Splitter model		
	400A/401A T1 100 Ω	**402A E1 120 Ω**	**403A E1 75 Ω**
Philippines		Y	Y
Poland		Y	Y
Portugal		Y	Y
Russia		Y	Y
Saudi Arabia		Y	Y
Singapore		Y	
South Africa		Y	Y
Spain		Y	Y
Sri Lanka		Y	Y
Sweden		Y	Y
Switzerland		Y	Y
Taiwan		Y	Y
Ukraine		Y	Y
UAE		Y	Y
UK		Y	Y
USA	Y		
Uzbekistan		Y	Y
Vietnam		Y	Y

1. Japan uses both 75-Ω and 120-Ω T1; 402A and 403A sync splitters will also work with T1s.

Verify the DS1 service

To verify the DS1 service, use the procedure in Table 3-5. Have the ATM switch installer verify the synchronization source.

Table 3-5. T1 or E1 service verification procedure

√	Step	Action	Command	Description
	1.	Check timing signal		Check that the GREEN STATUS 3 LED on the designated DS1 circuit pack is on steady.
	2.	Test the DS1 circuit pack	test board *UUCSS*	Test the designated DS1 board. If any one of Test 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*.
	3.	Run error report	list measurements ds1 *UUCSS* summary	Verify that the report is free of errors. See Table 3-6 on page 3-18 to help interpret the report.
	4.	Identify active synchronization source	status synchronization	Verify that the designated DS1 circuit pack is the *active* sync source. **Note**: The DS1circuit pack is not the sync source; it simply shows where the sync splitter is connected.

Table 3-6. Interpretation of the list measurements report

Displayed Field	Function	Indication
`Test: cpe-loopback -jack`	3-in-24 stress test pattern	The loopback jack test is active
`Synchronized`	= Y	The DS1 circuit pack is synchronized to the looped 3-in-24 pattern and is counting the bit errors detected in the pattern until the test is ended.
	= N	Retry the test: 1. Stop the test (**test ds1-loop *UUCSS* end cpe-loopback-jack-test**). 2. Restart the test (**test ds1-loop *UUCSS* cpe-loopback-jack-test-begin**) 3. Repeat Steps 1 and 2 a maximum of 5 times, as necessary. If the circuit pack never synchronizes, it is possibly due to intermittent connections or a broken wire in a receive or transmit wire pair.
`Bit Error Count`	Cumulative detected errors	0 indicates that there are no wiring problems. A count that sits at 65535 or continues to increment by several hundred to several thousand errors with each subsequent **list measurements** command indicates ■ Intermittent or corroded connections ■ Severe crosstalk ■ Impedance imbalances between the two conductors of the receive or the transmit pairs. 1. Replace wiring, if necessary. 2. Note whether the Extended Super Frame (ESF) error and performance counters summaries (errored seconds, bursty errored seconds, and so forth) also increment. Although these counters are not used with the loopback jack test, they do increment as errors occur.

Installing and testing the splitter

The splitter must be installed and tested before the upgrade and cutover. The purpose of testing the splitter is to

- Prove that there is enough signal level for the cable length to the ATM switch:
  - — up to 130 ft. (39.65 m) for 400A
  - — within the standard 6 dB allowable loss for 401A, 402A, and 403A (see Table 3-3 on page 3-14)
- Ensure that the DS1 circuit pack functions properly while receiving the DS1 signal level output from the splitter (Ports J1 and J2 unterminated).

Table 3-7 shows the configurations of the test cable and ports on the sync splitter.

Table 3-7. Cable and port configurations for splitter tests

To test	Description
Port J1	Insert an opening plug into port J2
Port J2	Insert an opening plug into port J1
Maximum output of the splitter to the DS1 circuit pack	Insert an opening plug into both ports J1 and J2

Splitter port tests (401A/402A only)

NOTE:
The standard RJ45-to-Bantam test cable does not work with the 403A.

To test the splitter ports J1 or J2, use the procedures in Table 3-8, using the RJ45 to Bantam Test cable from the 1541CC cable kit.

Table 3-8. Testing the splitter ports

√	Step	Action	Command	Description
	1.	Terminate one or more ports		Plug the RJ45 (modular) end of the DS1 test cable into the jack (J1 or J2) you wish to test on the splitter.
	2.	Connect to DS1 circuit pack		Plug the Bantam Plug end (plug with the black band) of the DS1 test cable into the Equipment-In (EI) jack on the DS1 circuit pack faceplate.

Continued on next page

Table 3-8. Testing the splitter ports (Continued)

√	Step	Action	Command	Description
	3.	Test DS1circuit pack	test board *UUCSS*	Wait 30 seconds, then test the circuit pack. If any tests fail, wait 5 minutes and test the DS1 circuit pack again.
	4.	Replace splitter if necessary		If any test still fails, replace the splitter and retest.
	5.	Escalate if necessary		If the test still fails, escalate to Tier 3 Support.

Installing a 400A T1 splitter

NOTE:
Make sure you are connected to the network before connecting to the DEFINITY Server.

Once the sync splitter passes the DS1 span tests, it can be installed and tested in place. The 400A sync splitter can be either

- Connected through an ICSU
- Connected through a DSU/CSU.

NOTE:
If using a TN464F/TN767E v18 or earlier, you must reseat the circuit pack each time the splitter is plugged on.

Connected through an ICSU. Use the procedures in Table 3-9 to install the splitter between an ICSU and a DS1 circuit pack.

Table 3-9. Installing the splitter through an ICSU

√	Step	Action	Command	Description
	1.	Disable synchronization switch	disable synchronization -switch	Prevent the system from switching synchronization sources.
	2.	Busyout DS1 circuit pack	busyout board *UUCSS*	Busyout the designated DS1circuit pack.
	3.	Remove cable from DS1 circuit pack		Remove the existing H600-307 cable from the backplane slot corresponding to the designated DS1 circuit pack.
	4.	Remove ICSU		Remove the ICSU from the designated DS1 circuit pack's amphenol connector. Re-use the existing cable attached to the ICSU.
	5.	Attach splitter		Plug the splitter into the same connector just vacated by the ICSU.
	6.	Attach ICSU		Plug the ICSU into the connector on the splitter.
	7.	Reconnect cable		Connect the H600-307 cable to the amphenol connector on the ICSU.
	8.	Check connections		Check that all Amphenol connections are good.
	9.	Secure splitter		Secure the splitter to the carrier using the 4C retainer from the ICSU.
	10.	Secure ICSU		Secure the ICSU to the splitter with a long cable tie.
	11.	Terminate the splitter ports J1 and J2		Insert a modular RJ45 plug in both ports J1 and J2. Do not connect port J1 to port J2, but leave the other end of both cords free. The modular RJ45 plug acts as an opening plug and removes the 100-Ω termination from port J1 and J2 on the splitter.
	12.	Check DS1 Status 3 LED		After about 20 seconds the LEDs on the DS1 circuit pack should go out, leaving only the GREEN STATUS 3 LED on.
	13.	Test the DS1 circuit pack	test board *UUCSS*	Test the circuit pack. If any one of Tests 138 - 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*
	14.	Clear the error events counters	clear measurements ds1 esf-error-events *UUCSS*	Clear the error events counter.

Continued on next page

Table 3-9. Installing the splitter through an ICSU (Continued)

√	Step	Action	Command	Description
	15.	Run report	list measurements ds1 summary *UUCSS*	Wait 15 minutes before entering the command. If the DS1 circuit pack is not error-free, refer to "Troubleshooting synchronization (400A only)" on page 6-31.
	16.	Replace connections		After testing is complete, remove the modular RJ45 opening plugs from port J1 and J2 of the splitter, and reconnect the cables to the port(s).
	17.	Test the ICSU		Depending on the ICSU model, go to the appropriate section: ■ Testing the 120A ICSU (Table 3-10) ■ Testing the 120A 2 ICSU (Table 3-11 on page 3-23)

Test the 120A ICSU with either a 700A DS1 CPE loopback jack or a 103A block. Use the procedure in Table 3-10 to test a splitter connected through an ICSU.

Table 3-10. The 120A ICSU test procedure

√	Step	Action	Command	Description
	1.	Connect 103A block if necessary		If the 700A DS1 CPE Loopback Jack is *not* installed or if the ICSU is not a 120A: ■ Connect a 103A block at the Smart Jack end of the H600-383 cable. ■ On the 103A block, strap pin1 to pin 3 and pin 2 to pin 4, which provides a loopback to the ICSU.[1]
	2.	Test the DS1 circuit pack	test board *UUCSS*	Test the DS1 circuit pack. If any one of Tests 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*
	3.	Clear the error events counters	clear measurements ds1 esf-error-events *UUCSS*	Clear the error events counters.
	4.	Run report	list measurements ds1 summary *UUCSS*	Wait 15 minutes before entering the command. To interpret the results, refer to Table 3-6 on page 3-18. If the DS1 circuit pack is not error-free, refer to "Troubleshooting synchronization (400A only)" on page 6-31.

Continued on next page

Table 3-10. The 120A ICSU test procedure (Continued)

√	Step	Action	Command	Description
	5.	Remove the 103A block		Remove the 103A block from Step 1.
	6.	Reconnect the cable		Connect the H600-383 cable to the smart jack or dumb block.

1. For more information about Smart Jack CPE Testing, see *Maintenance for Avaya MultiVantage™ DEFINITY Server R,* Chapter 6, “DS1 CPE Loopback Jack Installation and Operations Instructions.”

Use the procedures in Table 3-11 to test the 120A ICSU with the 700A DS1 CPE loopback jack.

Table 3-11. Testing the 120A 2 ICSU

√	Step	Action	Command	Description
	1.	Busyout the DS1 circuit pack	busyout board *UUCSS*	Busyout the DS1 circuit pack.
	2.	Start the CPE loopback test	test ds1-loop *UUCSS* cpe-loopback-jack-test-begin	Start the CPE loopback test. ■ If the test passes, the splitter is functioning properly; go to Step 3. ■ If the test fails, follow the procedures in “Troubleshooting synchronization (400A only)’’ on page 6-31.
	3.	Terminate the test	test ds1-loop *UUCSS* end-loopback/span-test	Terminate the test .
	4.	Release the DS1 circuit pack	release board *UUCSS*	Release the DS1 circuit pack .
	5.	Reassign synchronization	change synchronization	Reassign sync to the designated DS1 circuit pack .

Connected through a DSU/CSU. Before connecting any of the timing hardware, ensure that the DSU/CSU is configured to report loss of signal alarms.

If using a 316X CSU connected to a T1 facility and used as the DEFINITY Server synchronization source, verify or change the 316X settings (options) to ensure that it sends an AIS blue alarm to the DEFINITY Server DS1 circuit pack or to the ATM switch whenever a network LOS (loss of signal) occurs. Upon receiving a LOS, the DEFINITY Server or ATM switch transfers to its backup synchronization source.

To configure the 316X CSU to send an AIS blue alarm, use the procedures in Table 3-12.

Table 3-12. Configuring the 316X CSU to send AIS blue alarm

√	Step	Action	Description
	1.	Configure CSU	At the 316X CSU press the double-up arrow
	2.	Go through the readout steps	Press the button under “Cnfig.”
	3.	Continue	Press the button under “Activ.”
	4.	Continue	Press the button under “Edit.”
	5.	Continue	Press the right arrow until “GEN” displays.
	6.	Continue	Press the button under “GEN.”
	7.	Continue	Press F1 (“Next”) until “Gen Yellow Alarm” displays. (This option defaults as enabled.)
	8.	Continue	Press the button under “Disabled.”
	9.	Continue	Press the double-up arrow. `Save Option` displays when “Enabled” changes to “Disabled.”
	10.	Save settings	Press the button under the word “Yes” at the “Save Options Yes or No” prompt. Otherwise press F1 twice.
	11.	Save options	Press the button under “Activ” when asked where to save the options. `Command Complete` displays.
	12.	Return to default screen	The CSU times out to its default ESF CSU Operational screen or set it there by pressing the double-up arrow once and then pressing F1 twice.
	13.	Install the splitter	Go to Table 3-13 on page 3-25 to install the splitter.

NOTE:
All four faceplate status LEDs on the DS1 circuit pack are dark (not lit) when using an external CSU or DSU/CSU. The STATUS LEDs on the DS1 circuit pack are only functional with a 120A ICSU.

To install a 400A sync splitter between a CSU or DSU/CSU and a DS1 circuit pack, follow the procedures listed in Table 3-13.

Table 3-13. Splitter installation to DS1

√	Step	Action	Command	Description
	1.	Disable synchronization switch	disable synchronization -switch	Prevent the system from switching synchronization sources.
	2.	Busyout DS1 circuit pack	busyout board *UUCSS*	Busyout the designated DS1 circuit pack.
	3.	Remove cable from DS1 circuit pack		Remove the H600-307 cable from the amphenol connector located on rear of the DS1 circuit pack.
	4.	Attach the splitter		Plug the splitter into the same connector just vacated by the H600-307 cable.
	5.	Reconnect the cable		Plug the H600-307 cable into the connector on the splitter.
	6.	Secure the splitter		Secure the splitter to the carrier using the large mounting strap removed from a fiber transceiver.
	7.	Check connections		Check that all Amphenol connections are secure.
	8.	Release DS1 circuit pack	release board *UUCSS*	Restore the designated DS1 circuit pack to service.
	9.	Test the splitter		Use the procedure in "Splitter port tests (401A/402A only)" on page 3-19. ■ Before testing the splitter, insert a modular RJ45 plug into jack J1 and jack J2. **NOTE:** Do not connect port J1 to port J2. Leave the other end of both cords free, because the modular RJ45 plug acts as a opening plug and removes the 100-Ω termination from J1 and J2 ports. ■ After testing is complete, remove the opening plugs from J1 and J2.

Continued on next page

Table 3-13. Splitter installation to DS1 (Continued)

√	Step	Action	Command	Description
	10.	Check DSU/CSU LEDs		After about 20 s, all the alarm LEDs on the 316X CSU or DSU/CSU should go out. If this is the case, perform steps 11 through 12. Otherwise, go to step 13.
	11.	Check for CSU alarms		Verify that no alarms are against the CSU (the OK, SIG, SIG LEDs are lit).
	12.	Test the circuit pack	test board *UUCSS*	Verify that the DS1 circuit pack passes Tests 138 through 145. If these tests pass and this is a new installation, go to Step 14. If any one of Test 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*. After clearing all errors, retest the circuit pack.
	13.	Run error report	list measurements ds1 summary *UUCSS*	Wait 15 minutes. Check the error report and verify that the DS1 circuit pack is free of any errors. To interpret the periodic list measurements report.
	14.	DTE and RLB loopback tests (new installations)		Perform both DTE and RLB loopback test at the 316X CSU or DSU/CSU to verify that the DS1 board can successfully transmit and receive a DS1 signal through the splitter to the 316X and back to the DS1 board. Go to the ''DTE loopback procedure'' on page 3-27 and ''RLB loopback procedure'' on page 3-28

DTE loopback procedure. To start the Data Terminal Equipment (DTE) loopback at the 316X CSU or DSU/CSU, use the procedures in Table 3-14.

Table 3-14. DTE loopback testing for the 316X DSU/CSU

√	Step	Action	Command	Description
	1.	Begin the loopback test		Press the double-up arrow button.
	2.	Go through the readout steps		Press the button under “Test.”
	3.	Continue		Press the button under “Lpbk.”
	4.	Continue		Press the button under “DLB.” `Test Started` displays. The 316X is now in DTE loopback.
	5.	Test the circuit pack	test board *UUCSS*	At the DEFINITY Server management terminal. If any one of Test 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*.
	6.	Run error report	list measurements ds1 summary *UUCSS*	Wait 15 minutes and verify that the DS1 circuit pack is free of any errors. Use Table 3-6 on page 3-18 to interpret the periodic list measurements report.
	7.	Terminate the DTE loopback test		Press the double-up arrow button.
	8.	Go through the readout steps		Press the button under “test.”
	9.	Continue		Press the button under “lpbk.”
	10.	Continue		Press the button under “abort.”
	11.	Continue		Press the button under “all.”
	12.	Continue test procedure		If all tests pass, and the splitter, cabling, and 316X CSU or DSU/CSU are working properly, go to the “RLB loopback procedure” on page 3-28.

RLB loopback procedure . To start the RLB loopback testing at the 316X CSU or DSU/CSU, use the procedures in Table 3-15.

Table 3-15. RLB loopback testing for the 316X DSU/CSU

√	Step	Action	Command	Description
	1.	Start the test.		Press the double-up arrow button.
	2.	Go through the readout steps		Press the button under “Test.”
	3.	Continue		Press the button under “Lpbk.”
	4.	Continue		Press the button under “RLB.” `Test Started` displays. The 316X is now in RLB loopback.
	5.	Test the circuit pack	test board *UUCSS*	If any one of Test 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*.
	6.	Run error report	list measurements ds1 summary *UUCSS*	Wait 15 minute, then verify that the DS1 circuit pack is free of any errors. Use Table 3-6 on page 3-18 to interpret the periodic list measurements report.
	7.	Terminate the RLB loopback test		Press the double-up arrow button.
	8.	Go through the readout steps		Press the button under “test.”
	9.	Continue		Press the button under “lpbk.”
	10.	Continue		Press the button under “abort.”
	11.	Continue		Press the button under “all.” If all tests pass, and the splitter, cabling, and 316X CSU or DSU/CSU are working properly.
	12.	Return DSU/CSU to service		Press the double-up arrow.
	13.	Go through the readout steps		Press the right-arrow button until “Cntrl” displays.
	14.	Continue		Press the button under “Cntrl.”
	15.	Continue		Press the button under “LED.”
	16.	Continue		Press the button under the word PRT1, PRT2, PRT3 or PRT4 as required.

Continued on next page

Table 3-15. RLB loopback testing for the 316X DSU/CSU (Continued)

√	Step	Action	Command	Description
	17.	Verify that the DSU/CSU is in normal operating mode.		Press the double-up arrow once, then press the F1 button twice. `ESF CSU OPERATIONAL` displays.

Installing 401A, 402A, or 403A splitters

To install a 401A, 402A, or 403A sync splitter between the network and a DS1 circuit pack, follow the procedures listed in Table 3-16.

Table 3-16. Splitter installation to DS1 (401A/402A/403A)

√	Step	Action	Command	Description
	1.	Disable synchronization switch	disable synchronization -switch	Prevent the system from switching synchronization sources.
	2.	Busyout DS1 circuit pack	busyout board *UUCSS*	Busyout the designated DS1 circuit pack.
	3.	Administer sync splitter	change DS1 *UUCSS*	Administer the sync splitter. For T1, set the `Near-end CSU Type:` field to **integrated** (see Screen 3-1 on page 3-31). For E1, set the `E1 Sync-Splitter?` field to **y** (see Screen 3-2 on page 3-31).
	4.	Remove cable from DS1 circuit pack		Remove the cable from the amphenol connector located on rear of the DS1 circuit pack.
	5.	Attach the splitter		Plug the splitter into the same connector just vacated by the cable.
	6.	Reconnect the cable		Plug the cable into the connector on the splitter.
	7.	Secure the splitter		Secure the splitter to the carrier using the large mounting strap removed from a fiber transceiver.
	8.	Check connection		Check that the Amphenol connection is secure.
	9.	Reseat DS1 circuit pack		Release the clip holding the DS1 circuit pack, pull out slightly, close clip.

Continued on next page

Table 3-16. Splitter installation to DS1 (Continued)(401A/402A/403A) (Continued)

√	Step	Action	Command	Description
	10.	Release DS1 circuit pack	release board *UUCSS*	Restore the designated DS1 circuit pack to service.
	11.	Test the splitter		Use the procedure in "Splitter port tests (401A/402A only)" on page 3-19. ■ Before testing the splitter, insert a modular RJ45 plug into jack J1 and jack J2 (401A/402A only). **NOTE:** Do not connect port J1 to port J2. Leave the other end of both cords free, because the modular RJ45 plug acts as a opening plug and removes the 100-Ω termination from J1 and J2 ports. The standard RJ45-to-Bantam test cable does not work with the 403A. You need a coax-to-Bantam cable or an adapter for the RJ45 connector. ■ After testing is complete, remove the opening plugs from J1 and J2.
	12.	Check the 7 DS1 LEDs		After about 20 s, all the alarm LEDs on the DS1 go out and the status 3 LED is steady green. If this is the case, continue. If not, follow the DS1 span test procedures in the *Maintenance for Avaya MultiVantage and DEFINITY Server R*.
	13.	Test the circuit pack	test board *UUCSS*	Verify that the DS1 circuit pack passes Tests 138 through 146 and 1227. If these tests pass and this is a new installation, continue. If any one of Test 138 through 146 fails, follow the repair procedures in *Maintenance for Avaya MultiVantage and DEFINITY Server R*. After clearing all errors, retest the circuit pack.
	14.	Run error report	list measurements ds1 summary *UUCSS*	Wait 15 minutes. Check the error report and verify that the DS1 circuit pack is free of any To interpret the periodic list measurements report, refer to

```
add ds1 b10                                                  Page 1 of 2
                        DS1 CIRCUIT PACK

             Location: 01B10                      Name: xxxxxxxxxxxxxxx
             Bit Rate: 1.544               Line Coding: b8zs
       Signaling Mode: isdn-pri
              Connect: line-side
                                      Country Protocol: 1
                                      Protocol Version: a
  Interface Companding: mulaw                    CRC? n
           Idle Code: 11111111
                           DCP/Analog Bearer Capability: 3.1kHz




      Slip Detection? n                  Near-end CSU Type: integrated
                          Alarm When PRI Endpoint Detached? y
```

Screen 3-1. DS1 circuit pack—T1

```
add ds1 b10                                                  Page 1 of 2
                        DS1 CIRCUIT PACK

             Location: 01B10                      Name: xxxxxxxxxxxxxxx
             Bit Rate: 2.048               Line Coding: hdb3
       Signaling Mode: isdn-pri
              Connect: line-side
                                      Country Protocol: 2
                                      Protocol Version: a
  Interface Companding: alaw                     CRC? n
           Idle Code: 11111111
                           DCP/Analog Bearer Capability: 3.1kHz




      Slip Detection? n                  Near-end CSU Type: other
   E1 Sync-Splitter? y  Alarm When PRI Endpoint Detached? y
```

Screen 3-2. DS1 circuit pack—E1

Setting Up ATM Network Duplication

ATM-PNC configurations without duplicated SPEs can be supported with duplicated EPN connectivity to other points on an ATM network, or ATM network duplication. These points can be on separate ATM switches, the same ATM switch, or directly connected to an ATM-WAN.

With respect to port network connectivity, there is no difference in performance between ATM network duplication and critical reliability. ATM network duplication configurations require

- A simplex SPE complex in the PPN
- Duplicate connectivity over ATM to all PNs
- Duplicate ATM interfaces in each EPN
- Duplicate Tone-Clock boards in each EPN.

An ATM network duplication configuration can be the result of

- A new installation
- An upgrade from a standard reliability system

The EPN configuration for ATM network duplication is the same as for an EPN equipped for ATM critical reliability (Figure 3-9 on page 3-33).

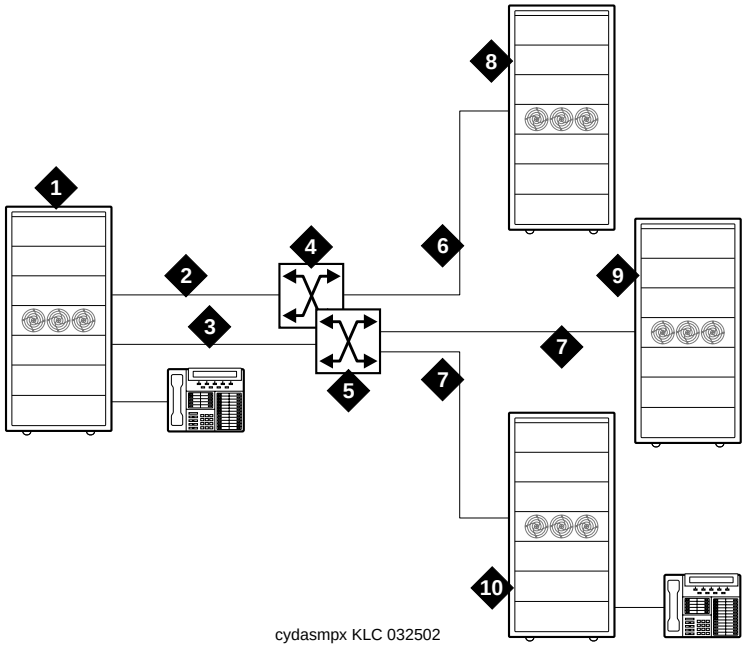

Figure Notes

1. DEFINITY Server PPN1
2. Fiber connecting ATM-EI A to ATM switch A
3. Fiber connecting ATM-EI B to ATM switch B
4. Avaya ATM switch A
5. Avaya ATM switch B
6. Fiber connecting ATM switch A to EPNs
7. Fiber connecting ATM switch B to EPNs
8. DEFINITY Server EPN2
9. DEFINITY Server PPN2
10. DEFINITY Server EPN3

Figure 3-9. EPN configuration with ATM network duplication

Network duplication administration

The procedure to administer ATM network duplication (Table 3-17) assumes that customers with:

- High reliability (duplex SPE complexes) and who desire greater reliability *would* migrate to critical reliability configurations
- Critical reliability configurations *would not* migrate to ATM network duplication

NOTE:
The screens follow the table and reflect what displays on an R10r platform using a SAT. Your screen interface and page numbers may differ.

Table 3-17. Network duplication administration procedure

√	Step	Action	Command	Description
	1.	Check that feature is turned on	display system-parameters customer-options	Ensure that the `PNC Duplication?` field on the customer options screen is **y** (Screen 3-3 on page 3-35). This field is controlled by the License File.
	2.	Add hardware		■ Insert a second TN2305/TN2306 ATM Interface circuit pack in slot in the B-position port carrier in each EPN or D-position carrier in EPNs configured for 2 port networks. ■ Add a TN2182 tone-clock circuit pack in the slot labeled Tone-Clock. Add it to the A-, B-, D- and E-position carriers in EPNs configured for 2 port networks.
	3.	Add ATM B-PNC address	change atm-pnc *number*	Bring up the ATM PNC screen (*number* is the connection number assigned to each PNC being administered). Add in the B-PNC ATM address information in the right-hand column of the screen (Screen 3-4 on page 3-35).
	4.	Enable duplication	change system-parameters duplication	Change the `Enable Operation of PNC Duplication?` field on the Duplication-Related System Parameters screen to **y** (Screen 3-5 on page 3-35). **NOTE:** The `Enable Operation of Spe Duplication?` field must remain **n**.

```
change system-parameters customer-options                      Page   3 of   6
                              OPTIONAL FEATURES

                    Hospitality (Basic)? y                PNC Duplication? y
         Hospitality (G3V3 Enhancements)? y
                             H.323 Trunks? n       Processor and System MSP? y
                              IP Stations? n              Private Networking? y
                        ISDN Feature Plus? y  Restrict Call Forward Off Net? y
                          ISDN-BRI Trunks? y          Secondary Data Module? y
                                 ISDN-PRI? y          Station and Trunk MSP? y
                     Malicious Call Trace? y
    Mode Code for Centralized Voice Mail? n            Tenant Partitioning? y
                       Mode Code Interface? y    Terminal Trans. Init. (TTI)? y
                  Multifrequency Signaling? y           Time of Day Routing? y
Multimedia Appl. Server Interface (MASI)? y           Uniform Dialing Plan? y
          Multimedia Call Handling (Basic)? y  Usage Allocation Enhancements? y
       Multimedia Call Handling (Enhanced)? y
                        Multiple Locations? y             Wideband Switching? y
             Personal Station Access (PSA)? y                       Wireless? y


         (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 3-3. Optional feature—screen 3

```
                                  ATM PNC


                          Connection Number: 12

             A - PNC                                  B - PNC

         Location: 02A01                      Location: 02B02
             Name: 123456789012345                Name: 123456789012345

  Address Format: E.164 ATM Private    Address Format: E.164 ATM Private

              AFI: 45                              AFI: 45
            E.164: 1234567890123456              E.164: 1234567890123456
           HO-DSP: 12345678                     HO-DSP: 12345678
              ESI: 123456789012                    ESI: 123456789012

              SEL: 12                              SEL: 13
```

Screen 3-4. ATM PNC

```
                                                                Page 1 of 1

                  DUPLICATION-RELATED SYSTEM PARAMETERS

          Enable Operation of SPE Duplication? n
          Enable Operation of PNC Duplication? y
```

Screen 3-5. Duplication-related system parameters

Changing circuit packs on the standby PNC

To partially or completely exchange circuit packs on an ATM network duplication switch without service interruption, follow this procedure:

1. Type **busyout pnc-standby** and press Enter
2. Type **busyout board *UUCSS*** and press Enter
3. Replace circuit packs on the standby PNC
4. Type **release board *UUCSS*** and press Enter
5. Type **release pnc-standby** and press Enter
6. Type **reset pnc interchange** and press Enter
7. Repeat steps 1-5 on the other side
8. Type **save translation** and press Enter

Installing a WAN Spare Processor

A WAN spare processor (WSP) acts as a backup to the main processor port network (PPN) in case the ATM connections to and from the main PPN are severed. Because of their role as a backup for disaster recovery, WSPs may be in different geographical locations. Even though existing calls are lost when this failure occurs, a WSP quickly acts as the main PPN, allowing system recovery with minimal down time.

The following sections contain information about

- Function
- Links
- Translations
- Priority administration
- Configurations
- Maintenance
- Dependencies
- Other hardware
- Alarming strategy

Function

Figure 3-10 shows the main connections in a typical ATM-WSP application.

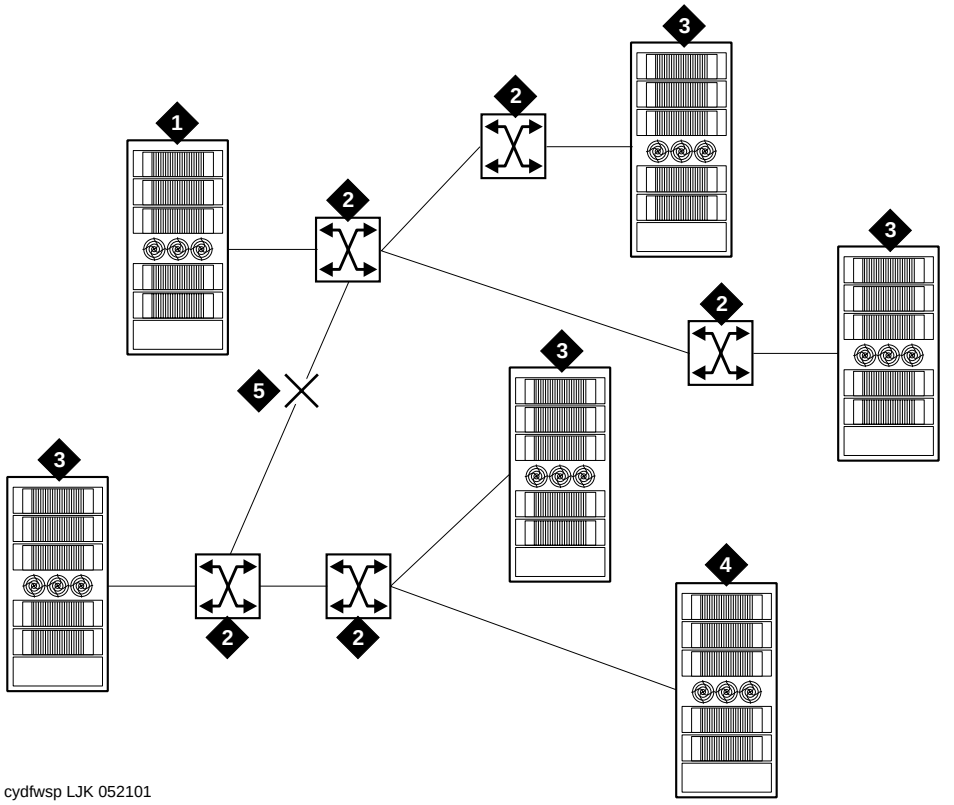

Figure Notes

1. Processor port network (PPN)
2. ATM switch
3. Expansion port network (EPN)
4. ATM WAN spare processor
5. ATM network fault

Figure 3-10. WAN Spare Processor (WSP) configuration

WSPs continually monitor the administered connection(s) to the main PPN to determine if the PPN is actively communicating with EPNs. An ATM-network failure breaks the connection between the EPNs and the PPN and signals the WAN spare processor to take over call processing control.

ATM-network failures can also include faults/problems:

- in the ATM switch.
- in the main PPN.
- within a link.
- in the ATM network's fiber-optic cables and connections.

When WSPs are initially administered, their state is standby (the normal state). When there is a break in the ATM network, a WSP goes from standby to active. If there is a failure in the Avaya DEFINITY Server, the ATM network, and/or any link in between, the main PPN alarms and each WSP that becomes active alarms.

Which WSP takes over the PPN functions depends upon where the failure in the ATM network occurs.

- If there is more than one WSP, the WSP that is administered with highest priority takes over the responsibilities of the main PPN before other, lower-priority WSPs. See Priority administration.
- A WSP becomes active and takes control of the EPNs when the connection with the main PPN is lost for the administered time period (5-99 minutes; the default is 8 minutes). The WSP then boots up and takes control. All calls are lost during these times.

Links

- A WSP becomes active by establishing Expansion Archangel Link (EAL) connectivity to the EPNs on a first come, first serve basis. A WSP does not disrupt existing EALs to EPNs.
- Standby condition for a WSP requires the establishment of links from each WSP to each other and to the main PPN.
- Every WSP could potentially take over the entire system if there are administered system links between the main PPN and each WSP and from every WSP to every other WSP. The WSPs and the main PPN monitor these links so that each processor can observe and report its status.

Translations

- The WSP and main PPN translations are the same, except for the WSP number.
- WSP databases can be updated manually while in the standby mode or automatically using Avaya ASP Manager (formerly DTA)
- The Avaya DEFINITY Server does not copy new translations from the PPN to the WSPs. You must upload the translations to the WSP either manually or through Avaya ASP Manager (formerly DTA).

Priority administration

- Each WSP is assigned a priority from 1 (the first PN to take over) to 15 (last PN to take over.)
- Ensure the integrity of the priority administration, because the system does not prevent 2 WSPs from having the same priority.
- A WSP can also have no priority, called a *blank* priority. A WSP that is administered with a *blank* priority plays dead, that is, it does not monitor any other WSPs and never become active. A *blank* priority facilitates interchanging the priority of two WSPs without having to remove them. A WSP with a priority of *blank* is treated by call processing and by maintenance software as if it does not exist.

Configurations

In addition to the material contained in this section, refer to Figure 3-10 on page 3-37 for a general configuration schematic.

Duplication

The ATM-WSP supports ATM-network duplication and Critical Reliability systems. The duplicated ATM-EIs link to

- 2 distinct ports on an ATM switch
- ports on separate ATM switches
- 2 distinct access points on an ATM WAN.

In this configuration, the links and associated ATM equipment or WAN elements are duplicated, but not the DEFINITY SPE.

Design considerations

When installing the WSP, ensure that the WSP configuration matches the main PPN configuration as show in Figure 3-11.

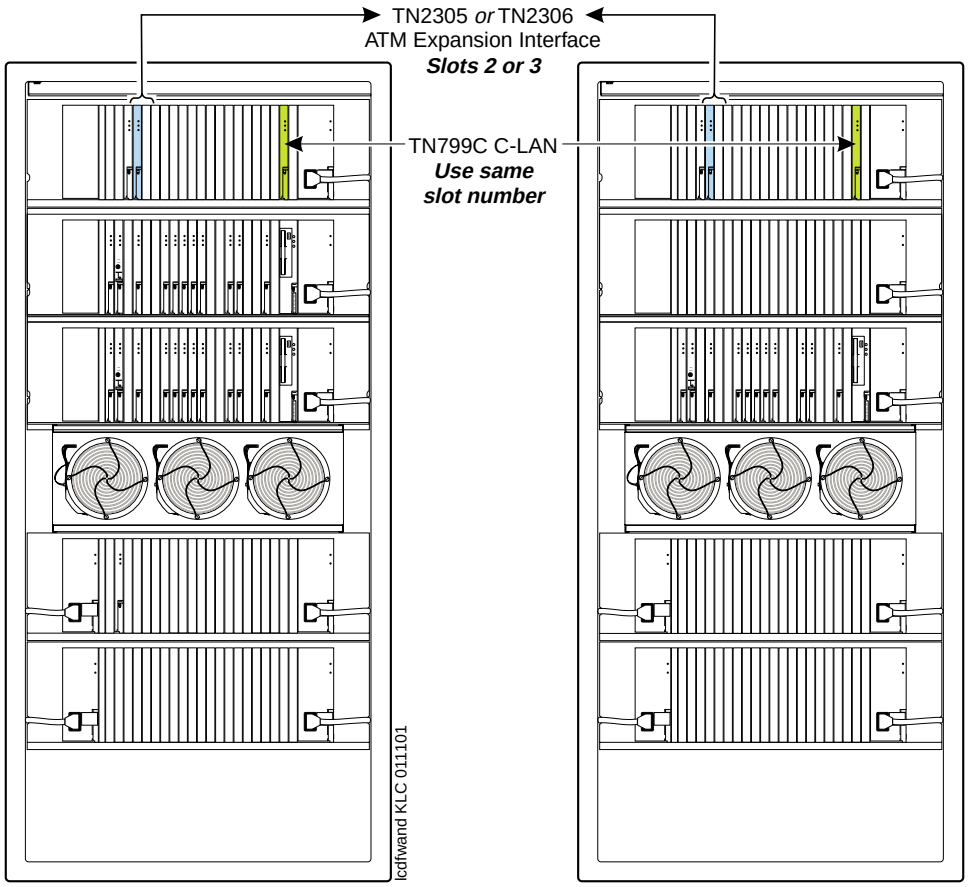

Figure 3-11. Main PPN and WSP showing location of control and port carriers

- If the main PPN is Standard Reliability or ATM-network duplication (simplex SPE), the port carrier in the WSP is located in Carrier B to match the PPN.
- If the main PPN is High or Critical Reliability (duplicated SPE), the port carrier in the WSP is located in Carrier C to match the PPN.
- The TN2305X or TN2306X ATM-EI circuit packs must be in the same carriers (B-E) and slots in both the main PPN and the WSP(s).

- If using Avaya ASP Manager (formerly DTA) the TN799B/C/DP C-LAN circuit packs must be in the same carriers and slots in the main PPN and WSPs.
- When registering the WSPs with INADS, give them the Installation Location (IL) number for the *main* PPN and the number of the WSP (1-15).

  NOTE:
  This is the administered WSP number, *not* the priority number.

Other ATM configuration guidelines

- DEFINITY hardware or software does not recognize a WSP as a port network when inactive. The number of port networks in an r configuration is not limited by the number of WSPs used. For example, the number of WSPs used is not subtracted from the total number of PNs to determine the number of PNs that the system can support.
- A WSP in the standby mode is not intended to be a Distributed Communications System (DCS) node. Although DCS could potentially be an effective backup or reroute strategy, DCS connections are not supported between parts of a failed switch. A WSP in *active* mode can have the DCS functionalities of the PPN.
- A WSP always has a simplex SPE, although it supports Standard, High, or and Critical Reliability, as well as ATM-network duplication.

Maintenance

- Maintenance functions are performed by the resident processor complex. That is, the main PPN performs its own maintenance, and the WSP performs maintenance on itself. The ATM-NTWK maintenance object monitors point-to-point WAN connectivity.
- Each WSP has alarming and remote administration capabilities similar to those of a main PPN.
- WSPs require an INADS connection.
- Once the main PPN becomes functional, you can restore a WSP to the standby mode. See Returning the WSP to standby mode.

Dependencies

- WSPs are available only when ATM-PNC is enabled on the PPN.
- ATM WSP is not compatible with Survivable Remote EPNs.

Other hardware

If you are using Avaya ASP Manager (formerly DTA) to copy translations, you must install a TN799B or later Control LAN (C-LAN) circuit pack in the main PPN and each WSP.

Alarming strategy

The alarm strategy rules for the ATM WSPs are as follows:

- When a WSP is active, it generates a LIC-ERR major alarm on the PPN and begins a 6-day countdown timer before the system goes into No-License mode. *This is normal*. This is to prevent using the WSP as the main PPN permanently.
- If there is a failure in the DEFINITY system, the ATM network, and/or any link in between, the main PPN alarms and each WSP that becomes active alarms.
- When a WSP is active, it performs exactly like the main PPN, generating its own alarms, for example, when it loses communication with an EPN.
- When a WSP is in standby mode, and it is unable to take over PPN functionality, it generates a minor alarm to the PPN.

Administration

WSPs must be administered and have the current translations from the main PPN installed on them. You can install the WSP translations manually or through the Avaya ASP Manager (formerly DTA) software.

Before you start

Ensure that the following items are ready before you proceed:

License File

Remote Feature Activation (RFA) is a Web-based application that enables the creation and deployment of License Files for all switches beginning with R10. The License File enables the switch's software category, release, features, and capacities. License Files are created using SAP order information and/or current customer configuration information. *Without a license file, the switch does not provide normal call processing*.

In order to be properly prepared for the upgrade, have the items listed in Table 3-18 ready.

Table 3-18. DEFINITY Server CSI pre-upgrade checklist

Item No.	Item	✓
1.	Software Release Letter	
2.	Avaya MultiVantage software on removable media	
3.	Extra formatted removable media	
4.	Authorized wrist grounding strap	
5.	Documentation (book or PDF file) for the current release: ■ *Maintenance for Avaya MultiVantage™ and DEFINITY® Server SI* ■ *Administrator's Guide for Avaya MultiVantage Software*	
6.	Your personal Single Sign-On (SSO) for RFA website authentication login.	
7.	SAP order number with RTUs	
8.	License File serial number(s)	
9.	Transaction Record number	
10.	System Identification (SID) number	
11.	Switch telephone number or IP address	
12.	Access to the RFA Information page for these items (if not already installed on your PC): ■ License Installation Tool (LIT) application ■ LIT documentation	
13.	Adobe Acrobat Reader application installed on your PC (to read FET and LIT documentation)	
14.	Internet Explorer 5.0 or higher installed on your laptop/PC	
15.	Intranet access to your designated RFA portal (see Go to the RFA website).	

Go to the RFA website

The Remote Feature Activation (RFA) website automates some of the upgrade procedures, including generating a License File.

1. At your laptop/PC browser, go to the appropriate website:
   - *Associates*: **http://associate2.avaya.com/**

     or the services portal: **http://usservices.avaya.com/**
   - *Business Partners* go to the appropriate regional Business Partner portal:
     - United States: **http://www.avaya.com/businesspartner/**
     - Canada: **https://www.avaya.ca/BusinessPartner**
     - Brazil: **http://www.avaya.com.br/Home.asp**
     - CALA: **https://cala-businesspartner.avaya.com/mnc/index.html**
     - EMEA: **https://emea-businesspartner.avaya.com/**
     - APAC: **http://www.avaya-apac.com/bp**
   - *Contractors* go to **http://www.avaya.com/services/rfa/**
   - If you are unable to access RFA using your recommended portal, try: **http://rfa.avaya.com**
2. Using your SSO, log in to the RFA website.
3. Follow the links to the RFA Information page.
4. Complete the information necessary to create a License File.

If you have a direct connection to the switch:

1. Do not deliver the License File at this time. You will deliver and install it later in this upgrade procedure.

If you do not have a direct connection to the switch:

1. Deliver the License File to your laptop/PC for installation later in this procedure.

Hardware and software

- DEFINITY Server in multicarrier cabinets (e.g., the Avaya MCC1 Media Gateway)
- Installed and administered ATM switch
- The same software version on the PPN and each WSP.

If you are using Avaya ASP Manager

- TN799B or later C-LAN circuit packs in main PPN and each WSP
- IP address for C-LAN circuit pack in the main PPN and each WSP
- DEFINITY Network Administration (DNA) Release 3 or later and Avaya ASP Manager (formerly DTA) software Release 1 or later.

Additional items required if copying translations manually

- 1 to 15 spare formatted removable media
- Overnight mail envelopes.

Basic Administration

The following procedure is the basic process for administering the WSPs and installing the translations.

- Install or upgrade main PPN with ATM and ACP Release 10 or Avaya Multivantage software.
- Install WSPs with ATM and ACP Release 10 or Avaya Multivantage software.
- Install a License File on main PPN and each WSP.
- Administer the WSPs on the main DEFINITY Server PPN.
- If using Avaya ASP Manager (formerly DTA), install and administer C-LAN circuit packs used for software in the main PPN and each WSP.

  NOTE:
  C-LAN circuit packs in the main PPN and WSPs are only used with Avaya ASP Manager software. All other C-LAN circuit packs must be in an EPN.

- Copy translations to each DEFINITY Server WSP either manually or by using the software-based Avaya ASP Manager tool.

Install Main PPN, ATM-PNC, and WSP

For instructions on installing a DEFINITY Server PPN and WSP, refer to Installation for Multicarrier Cabinets on the *Avaya MultiVantage on a DEFINITY Server and S8100 Library* CD, or the *Made Easy Tool for DEFINITY Media Server Configurations* online information. For instructions on installing ATM-PNC, refer to an earlier section in this chapter.

When installing the WSP, verify that the WSP configuration matches the main PPN configuration. See Figure 3-11 for configuration.

- If the main PPN is standard reliability, the B carrier in the main PPN and WSP can be a port carrier.
- If the main PPN is high reliability, the B carrier in WSP must be empty because that's where the duplicate control carrier is in the main PPN.
- The TN2305/TN2306 ATM expansion interface circuit packs must be in the same carriers and slots in the main PPN and WSPs.
- If using Avaya ASP Manager software, the TN799B/C C-LAN circuit packs must be in the same carriers and slots in the main PPN and WSPs.

Administration

This section contains information about

- Administration interactions.
- Avaya ASP Manager (formerly DTA).

Points to consider when administering WSPs:

- The ATM network can span multiple time zones, including some areas that do not observe Daylight Savings Time.

  Set the system time on all WSPs the same as the time on the main PPN to avoid system time offsets in the event of a major failure.

- If the value of the `Enable Operation of PNC Duplication` field on the System-Parameters Duplication screen is **y** on the WSP, the system checks that

  — the PPN's A-PNC and B-PNC as well as the WSP's A-PNC and B-PNC are all administered.

  — both the A-PNC and B-PNC circuit packs are administered for the local WSP on the Maintenance-Related System Parameters screen.

Administration interactions

The system shares information on the ATM PNC and the WAN Spare Processor forms. These interactions include:

- A-PNC and B-PNC addresses last default values are shared with and updated by the WSP forms.
- The A-PNC and B-PNC circuit pack locations must be different. If the value in the `WAN Processor Role` field is **spare** and the `Enable Operation of PNC Duplication` field on the System-Parameters Duplication screen is set to **y,** the B-PNC Board Location field cannot be blank.
- PNC Duplication cannot be enabled on a spare switch if the main WSP has 2 A-PNC addresses administered.
    1. Remove the B-PNC address from all WSPs (1-15).
    2. Disable PNC Duplication.

Avaya ASP Manager (formerly DTA)

The Avaya ASP Manager (formerly called DTA) software tool makes administering ATM WSP translations more accurate and efficient compared to manually entering data at the DEFINITY Server SAT.

NOTE:
Avaya ASP Manager requires DEFINITY Network Administration (DNA) Release 3 or later software and the TN799C (C-LAN) circuit pack.

Administer WSP on Main PPN

Check SPE

1. Type **status spe** and press Enter to check the health of the SPE.

   For standard reliability systems:

   - The `Standard` field shows **active**, **In Service**

   For high reliability systems:

   - The `Standby Refreshed` field shows **yes**
   - The `Standby Shadowing` field shows **on**
   - The `Standby Handshake` field shows **up**

Administer WSP

1. Type **add atm wsp *number*** where the number is the number of the WSP from 1 to 15.
2. Type the name of the WSP in the `Name` field. Can be up to 15 alphanumeric characters.
3. In the `Product Identification` field type the 10-digit number assigned to that WSP by INADS.
4. Type the priority number of the WSP in the `Priority:` field from 1 to 15, where 1 would be the first WSP to take over.
5. Type the ATM address in the `Address` fields for the WSP. Record the information in DEFINITY Server Administration Worksheet for ATM-PNC.
6. Repeat steps 1 through 5 for each WSP (1 to 15).
7. Once the WSPs are administered on the main PPN, you must copy translations from the main PPN to each WSP in one of two ways:
   - Copy Translations Using the Avaya ASP Manager software
   - Copy Translations Manually.

Copy Translations Using the Avaya ASP Manager software

Before copying translations, you must install, administer, and test a C-LAN circuit pack on the main PPN and each WSP.

NOTE:
The C-LAN circuit pack must be installed in the same slot in the WSP as it is in the main PPN (see Figure 3-11). If you have additional C-LAN circuit packs, they must be installed in an EPN.

For information on installing and administering the C-LAN circuit packs and testing the network connection, see Installing and Administering C-LAN Circuit Pack and Testing the External Connection to the LAN, respectively.

For information on installing the Avaya ASP Manager software, refer to the documentation that comes with its software CD.

Make sure you have the following equipment and information on site:

- TN799B/C C-LAN circuit pack in the main PPN and each WSP
- IP address for C-LAN circuit packs on main PPN and each WSP
- DEFINITY Network Administration (DNA) Release 3 or later and the Avaya ASP Manager (formerly DTA) software.

With this software, the PC has both a client and server component; therefore, your PC must meet the following minimum requirements:

- Windows NT/2000 operating system (server component)
- Windows 95/98/ME/NT/2000 operating system (client component)
- 32-MB RAM (64 MB recommended)
- 40-MB available disk space (client side—50 MB recommended)
- 40-MB available disk space (server side) plus 10-MB disk space for each WSP (50 MB plus 15 MB recommended)
- CD-ROM drive
- Ethernet network connection

Enable Avaya ASP Manager

1. Type **display system-parameters customer-options** and press Enter.
2. On screen 2 ensure that `DEFINITY Network Admin?` field is set to **y**.

Once DNA and the Avaya ASP Manager are installed and enabled, you must do the initial administration, which is to

- Configure the main PPN and each WSP
- Test the connection between Avaya ASP Manager and the main PPN and between Avaya ASP Manager and each WSP
- Set up the schedule for uploading the translations from the main PPN to the between Avaya ASP Manager server and downloading the translations from the Avaya ASP Manager server to each WSP.

For information on initial administration, testing, and scheduling the upload, refer to the *Avaya™ ATM WAN Spare Processor Manager Release 1.1 Installation and Configuration* book that comes with the Avaya VisAbility™ Management Suite software CD and the online help for its management software applications.

Installing and Administering C-LAN Circuit Pack

To install a C-LAN circuit pack, you need the following items:

- An unoccupied port slot (must be same slot in each WSP as in main PPN, see Figure 3-11)
- A 10 BaseT Ethernet connection into your local area network.
- Valid, unused, unique IP addresses on your network for the C-LAN circuit packs in the main PPN and each WSP.

You also need the following hardware; 1 each for the main PPN and 1 each for each WSP:

- TN799B/C or later Control-LAN (C-LAN) circuit pack
- 259A connector
- CAT5 cable.

Installing the TN799B/C (C-LAN circuit pack)

From the rear of the cabinet:

1. Connect the 259A connector to the backplane connector corresponding to the TN799B/C slot.
2. Connect one end of the CAT5 cable to the 259A connector. Connect the other end to the customer's network.

   From the front of the cabinet:

   CAUTION:
   When adding or replacing any hardware, be sure to ground yourself against electrostatic discharge (ESD) by wearing a grounded wrist strap.

   NOTE:
   The TN799B/C circuit pack is hot-swappable, so you do not need to power down the carrier to install it.

3. Insert the TN799B/C circuit pack into the port slot identified earlier.

Administering the TN799B/C (C-LAN circuit pack)

NOTE:
For more complete information refer to Chapter 5 in the book titled, *Administration for Network Connectivity for Avaya MultiVantage Software*.

Administer the TN799B/C in the main PPN and each WSP.

1. Type **change node-names ip** and press Enter.

```
 change node-names ip                                          Page   1 of   1
                                  NODE NAMES

    Name              IP Address          Name              IP Address
ppn_clan             192.168.10 .21                          .   .   .
dta_pc               135.9  .167.180                         .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
                        .   .   .                           .   .   .
```

NOTE:
You need IP addresses for the main PPN and each WSP.

2. In the Name and `IP Address` fields, type the name and IP address for the C-LAN circuit pack.
3. Add a name and IP address for each additional endpoint that will be *dialing into* the C-LAN circuit pack; up to 8 total.
4. Press Enter to effect changes.
5. Type **change ip-interfaces** and press Enter.

```
change ip-interfaces                                          Page   1 of   4

                                  IP INTERFACES
 Inter-region IP connectivity allowed?  n
Enable                                                                    Net
Eth Pt Type   Slot  Code Sfx Node Name       Subnet Mask     Gateway Address Rgn
  n  C-LAN  01C019 TN799 B  ppn_clan        255.255.255.0      .   .   .    1
  n                                        255.255.255.0      .   .   .
  n                                        255.255.255.0      .   .   .
  n                                        255.255.255.0      .   .   .
  n                                        255.255.255.0      .   .   .
  n                                        255.255.255.0      .   .   .
  n                                        255.255.255.0      .   .   .
```

NOTE:
Do not change the `Enabled` field to **y** until all the information in the row is completed.

6. Fill in a row for each TN799B/C circuit pack installed. Accept the default in the `Net Rgn` field.

   NOTE:
   Use the same node name assigned on the Node Names screen

   If a router is used as a network gateway, then use the gateway address for the *router* connected to the hub supporting the C-LAN circuit pack.

7. Press Enter to effect the changes.
8. Type **change ip-interfaces** and press Enter.
9. Type **y** in the `Enabled` field for each completed row.
10. Press Enter to effect the changes.
11. Type **change ip-services** and press Enter.

```
change ip-services                                          Page   1 of   x
                              IP SERVICES
Enabled Service     Local          Local   Remote           Remote    Protocol
Eth Pt  Type        Node           Port    Node             Port      Enabled
   n    SAT_______  ppn_clan       9001    dta_pc_________  0____
   n    _________   _____________  _____   _____________    _____
   n    _________   _____________  _____   _____________    _____
   n    _________   _____________  _____   _____________    _____
   n    _________   _____________  _____   _____________    _____
   n    _________   _____________  _____   _____________    _____
   n    _________   _____________  _____   _____________    _____
```

NOTE:
Do not change the `Enabled` field to **y** until all the information in the row is completed.

12. For a secure, restrictive dial-up configuration, fill in the following fields:
    - `Service Type`: **SAT**
    - `Local Node`: slot location of the TN799B/C
    - `Local Port`: any unused port, generally 9001 or higher
    - `Remote Node`: a specific PC node name assigned on the IP Interfaces screen. Do not type **any**
    - `Remote Port`: **0** (default)

13. For a less secure, nonrestrictive dial-up configuration, type **any** in the Remote Node: field. No node name additions are required.
14. Press Enter to effect changes.
15. Type **change ip-services** and press Enter.
16. Type **y** in the `Enabled` field for each completed row. Enabling the local node turns on the listen socket.
17. Press Enter to effect changes.
18. Type **add data-module next** and press Enter.

```
add data-module next                                  Page 1 of X
                        DATA MODULE

    Data Extension: 2377       Name: ethernet on link 2
              Type: ethernet
              Port: 01c1917_
              Link: 2

Network uses 1's for broadcast addresses?: y
```

19. Fill in the following fields:
    - `Type`: **ethernet**
    - `Port`: ***UUCSS*17**, where *UUCSS* is the slot location for the C-LAN circuit pack
    - `Link`: an unassigned link number from 1 to 33
    - `Name`: a descriptive name for the data module
    - `Network uses 1's for broadcast addresses?`: **y** (default)
20. Press Enter to effect the changes.

Testing the External Connection to the LAN

To test the external IP connections, ping the C-LAN gateway and, if possible, ping a known computer connected to your network. If everything is configured correctly, the `Result` column on the Ping Results screen reads **PASS**. If it reads **FAIL** or **ABORT**, verify the IP-address information and check the connectivity, including the cabling.

1. Type **ping ip-address *nnn.nnn.nnn.nnn* board *UUCSS*** and press Enter.

   The variable ***nnn.nnn.nnn.nnn*** is the IP address of the TN799B/C C-LAN circuit pack and ***UUCSS*** is the cabinet, carrier, and slot of the TN799B/C C-LAN circuit pack.

```
ping ip-address 192.168.10.21

                          PING RESULTS

  End-pt IP        Port      Port Type  Result    Time(ms)  Error Code

  192.168.10.21    01C19        CLAN     PASS       10        1124
```

2. Type **ping ip-address *nnn.nnn.nnn.nnn* board *UUCSS*** and press Enter.

   The variable ***nnn.nnn.nnn.nnn*** is the IP address of the customer's gateway and ***UUCSS*** is the cabinet, carrier, and slot of the TN799B/C C-LAN circuit pack.

3. Type **ping ip-address *nnn.nnn.nnn.nnn* board *UUCSS*** and press Enter.

   The variable ***nnn.nnn.nnn.nnn*** is the IP address of another computer beyond the gateway and ***UUCSS*** is the cabinet, carrier, and slot of the TN799B/C C-LAN circuit pack.

The TN799B/C C-LAN circuit pack is now installed and administered in the DEFINITY Server's carrier and connected to the IP network.

Copying Translations

Within the Avaya ASP Manager software tool, setup and test the LAN connection between your PC and the main PPN and each WSP, following the instructions in the online help.

Copy translations immediately, or setup a scheduled time to copy them from the main PPN to each WSP.

Copy Translations Manually

Before copying translations, you must have the following equipment:

- 1 to 15 spare formatted removable media
- Overnight mail envelopes

You must physically send the spare removable media containing system translations to each WSP location, using overnight mail. You can send the removable media to each location in series or copy the translations to several removable media and send to each location simultaneously. The choice depends on how critical it is to get the WSPs set up.

On the Main PPN

1. Type **save translations** and press Enter to save translations to the system disk. When prompted, *do not preserve the License File with the translations*.

   CAUTION:
   When working with any cabinet hardware, wear a grounded wrist strap to ground yourself against electrostatic discharge (ESD).

2. Replace the existing removable media in the active carrier with a spare one, label facing left, into the optical drive.

   NOTE:
   Make sure the formatted removable media is not write-protected before placing it into the optical drive *(see Figure 3-12)*. If you can see through the hole (as in callout 2), it is write-protected.

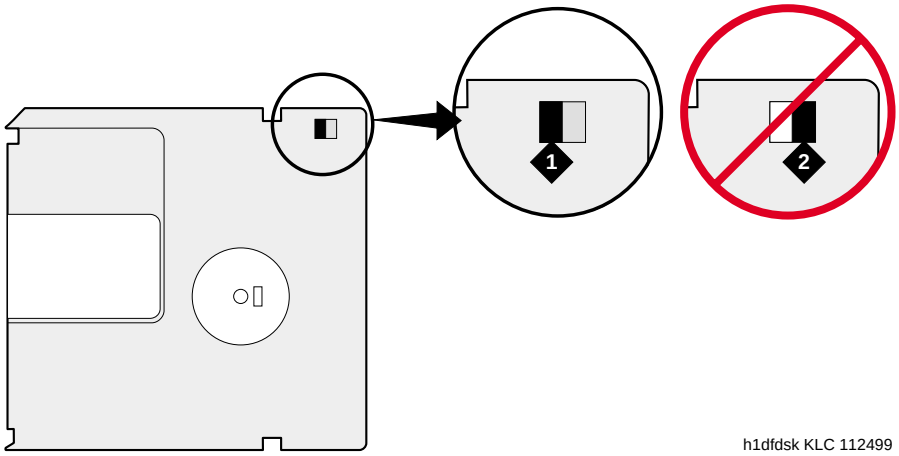

Figure Notes

1. Not Write-protected
2. Write-protected

Figure 3-12. Make sure the disk is not write-protected.

CAUTION:

The removable media has a sliding, metal cover to protect the surface of the disk. DO NOT TOUCH THE DISK (Figure 3-13).

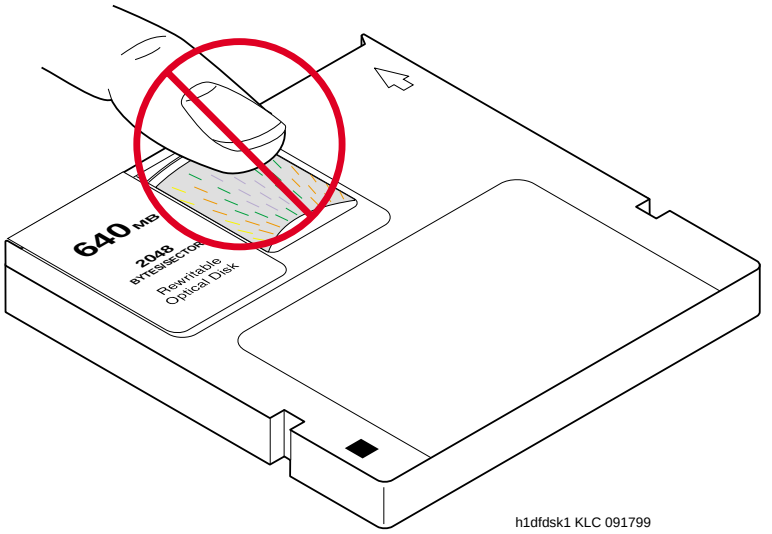

Figure 3-13. Do not touch the disk inside the cartridge.

3. Type **list configuration software-versions** and press Enter. Check the software version shown in the `Memory Resident`, `Removable Media Resident`, and `Disk Resident` fields. Make sure the `Removable Media Resident` field shows the same software load as the other two.

CAUTION:

If the `Memory Resident` *and* `Disk Resident` *fields show that the software version is different than what's on the removable media, then you must back up the disk to the spare removable media before continuing. If all fields show the same software version, they you may save translations to the removable media.*

NOTE:

If you are sending translations to several sites, you may want to save translations to several spare removable media and send out simultaneously.

4. Type **backup disk full** and press Enter to back up the software load, announcements, and translations to the spare removable media on the active carrier.

   or

   Type **save translation removable-media** and press Enter to save translations to the spare removable media on the active carrier, which takes about 2 minutes.

5. Repeat steps 2 through 4 for each spare removable media you need.
6. When done, replace the spare removable media with the original one.
7. Send the spare removable media with the updated system translations to the first WSP location using overnight mail. Or if you saved translations to several spare removable media, send to all locations simultaneously.

On Each WSP

CAUTION:
When working with any cabinet hardware, wear a grounded wrist strap to ground yourself against electrostatic discharge (ESD).

Deliver or Install the License File

If you have a direct switch connection:

1. Go to the RFA website, and, following the instructions in the “Deliver to G3r/G3si/G3csi” chapter of the RFA Job Aid, deliver the License File.

   NOTE:
   This procedure sends the License File to the switch and installs it.

If you do not have a direct connection:

1. Go to the RFA website, and, following the instructions in the “Deliver to G3r/G3si/G3csi” chapter of the RFA Job Aid, deliver the License File to your laptop/PC.
2. Open the License Installation Tool (LIT) application at your laptop/PC.
3. Use the LIT instructions to add a switch connection profile to the tool.
4. Use the LIT instructions to install the License File on the switch.

Replace Removable Media

1. Replace the existing removable media with the one with the translations from the main PPN, label facing left, into the optical drive.

Verify software version

1. Log in.
2. Type **list configuration software-versions** and press Enter. Check the software version shown in the `Memory Resident`, `Removable Media Resident`, and `Disk Resident` fields. If all the fields show the same version, then copy the new translations to disk.

CAUTION:
If the `Memory Resident` *and* `Disk Resident` *fields show that the WSP software is different than what's on the removable media, then you must restore the disk.*

Restore Disk

NOTE:
Until this command finishes, the system provides no user feedback on the screen. Do not press Enter while the command executes. Doing so causes the screen to clear as the command finishes; erasing any success or failure messages the system may provide.

1. Type **restore disk full** and press Enter to copy the translations, announcements, and software load from removable media to the system disk, which takes about 10 minutes.
2. Place a new, formatted removable media disk in the optical drive.
3. Type **save translations** and press Enter to copy the translations, which takes about 2 minutes. *When prompted be sure to preserve the license file to this disk.*
4. Keep this disk with the unique License File information with this WSP only.

Disconnect the Fiber

1. Physically unplug the fiber cable from the TN2305/TN2306 circuit pack (from both the TN2305 packs if there are two) to prevent the WSP from attempting to establish EAL connections.

Reset WSP

1. Ensure that the removable media with the unique License File information for this WSP is in the optical drive.
2. Type **reset system 3** and press Enter to reboot the system with the new translations and License File, which takes about 2 minutes.

   NOTE:
   When prompted to preserve the License File or not, choose Yes. This preserves the unique License File *for this WSP only*.

Set WSP Role

1. Log in.
2. Type **change system-parameters maintenance** and press Enter.
3. On screen 5, type **pending** in the `WAN Processor Role` field.
4. Press Enter to effect changes.

Remove SPE Duplication (if main PPN is high reliability)

1. Type **change system-parameters duplication** and press Enter.
2. Set `Enable Operation of SPE Duplication` field to **n**.
3. Press Enter to effect changes.
4. Type **save translations spe-a** and press Enter to save translations.
5. Type **reset system 3** and press Enter to reboot the system with the new translations and License File, which takes about 2 minutes. This is necessary to eliminate SPE duplication on the WSP.

Busyout Fiber Link

1. Log in.
2. Type **list atm pnc** and press Enter. Look for the number that corresponds to the ATM-PNC line(s) in the main PPN (either 1 or 2 lines).
3. Type **busyout atm pnc *number*** and press Enter
4. Repeat for the other ATM-PNC line, if 2.

Remove the Fiber Link

1. Type **remove atm pnc *number*** and press Enter.
2. Repeat for the other ATM-PNC line, if 2.
3. Press Enter to effect changes.

Remove Translated Packs

1. Type **change circuit 1** and press Enter to verify that the TN2305/TN2306 boards match your configuration.

Change WSP Role

1. Type **change system-parameters maintenance** and press Enter.
2. On screen 5, type **spare** in the `WAN Processor Role` field, which displays additional fields.
3. In the `WSP number:` field, type the number of the WSP (1 to 15). This is *not* the priority number.
4. In the `WSP Activation Timer (mins):` field, type the number of minutes after which you want the WSP to take over (5 to 99).
5. In the `A-PNC Board Location` field, type the location of the ATM-EI board (carrier, slot). If the main is ATM Network Duplication or Critical reliability, you also must enter the `B-PNC Board Location` .
6. Press Enter to effect changes.

Reconnect the Fiber and Replace Removable Media

CAUTION:

When working with any cabinet hardware, wear a grounded wrist strap to ground yourself against electrostatic discharge (ESD).

1. Physically plug in the fiber optic cable to the TN2305/TN2306 circuit pack (to both TN2305 packs, if there are two).
2. Replace the spare removable media containing the main PPN translations with the original WSP removable media, label facing left, into the optical drive.

Save Translations

1. Type **save translations** and press Enter to save translations to the system disk.
2. Type **save translation removable-media** and press Enter to save the current translations to the original removable media.

Deliver Translations

If sending the main PPN translations in series, send the removable media to the next WSP location using overnight mail. If sending translations concurrently, send the removable media to the all the WSP locations using overnight mail.

Returning the WSP to standby mode

Returning to normal operating mode, in which the main PPN controls the system, is a manual procedure. We recommend that you perform this procedure when it is least disruptive. WSPs are returned to normal mode of operation typically after the main PPN has been restored. It is possible restore the WSP through a remote login.

NOTE:
A main PPN that has been inactive and an attempt has been made to return it to the active state requires manual intervention to prevent an active WSP from taking over for the main PPN. For example, when performing upgrades on simplex systems with WSPs, we recommend that you **busyout atm wsp** for the highest priority WSP so the WSP does not attempt to become active. Don't forget to **release atm wsp** when the main is back in operation. If an active WSP discovers that a higher priority WSP is confirmed up and the active WSP has no EALs up, it automatically reverts to standby.

After the problem that caused a WSP to take over is fixed, you must return the switches to normal operation. The main PPN takes over automatically once it is restored to service. However, the WSP must be manually restored.

On the main PPN:

1. At the PPN's SAT, type **status atm wsp** and press Enter to make sure the ATM network is up and running.
2. At the WSP's SAT, type **reset system 2** and press Enter to return the WSP to standby mode.

Upgrading to ATM-PNC

4

This chapter describes the procedures for upgrading a DEFINITY® Server R with a center stage switch (CSS) to Avaya MultiVantage™ Software on a DEFINITY Server R ATM-PNC.

Preparation

Table 4-1 lists the items that must be completed and the equipment or materials available before starting the upgrade procedure.

Table 4-1. Pre-upgrade checklist

√	Component	Description
	Cabinet	Installed and fiber-prepped (fiber pass-through with ST-to-SC adapters (if necessary). Because of the terminating connectors, fiber-optic cabling from the CSS configuration is usually not re-usable. See Upgrade and Additions for DEFINITY Server R or the Made Easy Tool.
	ATM switch(es)	ATM switch(es) ■ Installed ■ Fiber connected ■ Modem connections work and phone numbers recorded
	Synchronization	Synchronization splitters in DS1 spans and cables are connected to ATM switch(es). Verify proper synchronization of ATM switches to both primary and secondary sources.

Continued on next page

Table 4-1. Pre-upgrade checklist (Continued)

√	Component	Description
	Required circuit packs	All circuit packs required for running Avaya MultiVantage Software on a DEFINITY Server R are installed and administered.
	License File	The License File must match the serial number(s) of the installed hardware, and the `Async.Transfer Mode (ATM) PNC` field must be **n** and underlined (changeable) meaning that the feature is ***enabled but turned off***. See the Customer Options form (Screen 4-6 on page 4-14).
	Translations on removable media	Have both the customer's translations on removable media (optical disk) and a fall-back copy (also on removable media)[1].
	ATM circuit packs	ATM interface circuit packs (TN2305X/TN2306X)
	Design	Customer's configuration (SDSC)
Critical reliability/network duplication only		
	Duplication	2 independent switches or 1 switch with duplicated switch fabrics and controls Independent fiber optic connections between the OC-3/STM-1 ATM interfaces and each duplicated switch fabric
	Power supply	No single power failure (other than the commercial AC source) able to cause ■ both pairs of switch fabric and controls to simultaneously fail—no one power failure (excluding AC source) ■ all interface circuits to fail simultaneously
	Back up power	Back up option (independent of commercial AC source) installed

1. After upgrading the DEFINITY Server R to Avaya MultiVantage Software, use the spare formatted optical disk for the fall-back removable media. Do NOT use an off-the-shelf optical disk.

Upgrading DEFINITY Server R with CSS to ATM-PNC

This procedure includes all reliabilities and assumes that cabinet 1 is the PPN. When using the commands in this table, type the command and then press Enter.

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC

√	Step	Action	Command	Description	More information	Site-specific comments
	1.	Upgrade DEFINITY Server R to Avaya MultiVantage Software		Refer to *Upgrades and Additions for DEFINITY Server R* for complete procedures. In this upgrade you must install a new License File with `Async.Transfer Mode (ATM) PNC` enabled and turned off.		
	2.	Check ATM-PNC availability	change system-parameters customer-options	Ensure that the `Async.Transfer Mode (ATM) PNC` field is **n** and underlined (changeable) meaning that the feature is enabled but turned off. Try changing this field to **y**, and you should get an error message indicating that you must remove all switch-node carriers before enabling ATM-PNC. Then cancel the command. If the form already shows **y** for this field, you should change it to **n** and do a **reset system 2**, as the License File is incorrect.	Screen 4-6 on page 4-14	
	3.	Suppress alarms and disable scheduled maintenance	change system-parameters maintenance	Ensure that the ■ `Alarm Origination to OSS Numbers` field is **neither** ■ Scheduled Maintenance is disabled.	Screen 4-1 on page 4-12	
	4.	Load new removable media		Label and load duplicate fall-back removable media.		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	5.	Make duplicate removable media	save translations removable-media	Save translations to fall-back removable media.		
	6.	Check health	status pnc	Ensure proper switch functions. Resolve any alarms before proceeding.	Screen 4-2 on page 4-12	
	7.	Check synchronization source	status synchronization	Is the synchronization source healthy? If synchronization source is in an EPN, move it to a PPN or remove this EPN last.		
	8.	Disable synchronization switching	disable synchronization-switch	Disable switching to secondary synchronization source.		
	9.	Change synchronization source	change synchronization	Remove all DS1 timing references.	Screen 4-5 on page 4-14	
	10.	Determine active PNC	status pnc	Ensure that the A-PNC is active. If necessary use the **reset pnc-interchange** command to make the A-PNC active.		
	11.	Busyout B-PNC (standby)	busyout pnc-standby	Busyout the standby (B) PNC before removing any physical connections.		
	12.	Disable PNC duplication	change system-parameters duplication	Change the `Enable Operation of PNC Duplication` field to **n**.		
	13.	List fiber links	list fiber-link	Displays numbered list of administered fiber links		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	14.	Busyout fiber	busyout fiber-link <*number*>	Busyout each fiber link associated with the center stage switch. Start with fiber associated with the last translated switch node (SN) and end with the PPN fiber. **NOTE:** Service outage begins at this time.		
	15.	Remove fiber links	remove fiber-link <*number*>	Remove the fiber link administration associated with the center stage switch. **CAUTION:** *Failure to remove fiber link administration before removing hardware causes unnecessary INADS alarms and errors that may be difficult to clear.*		
	16.	List cabinets	list cabinet	Displays numbered list of administered cabinets		
	17.	Remove circuit pack administration	change circuit-packs	Remove administration (blank out fields) for all EI, SNI, SNC, and DS1-CONV circuit packs in the center stage carriers.		
	18.	Remove switch node and duplicate switch node administration	change cabinet <*number*>	Remove switch node and duplicate switch node carrier administration from all applicable cabinets/carriers (select **not-used** for the appropriate fields).	Screen 4-3 on page 4-13	
	19.	Save translations	save translation removable-media	Interim translation capture for potential fall-back		
	20.	Power down all center stage carriers		Power down the center stage carrier by removing the plug(s) from the power unit at the edge.		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	21.	Remove all CSS-related hardware		Physically remove all EI, SNI, SNC, and DS1-CONV circuit packs (and metal cabling on back of cabinet) associated with the center stage switch. **NOTE:** On the back of the cabinets you must also remove the fiber-optic interfaces (“warts”) corresponding to the TN570 (Expansion Interface) circuit packs. If these interfaces remain connected to the new ATM interface circuit packs, ATM-PNC will not operate properly. **DANGER:** *The metal hood on metallic cable connectors may be hot.*		
	22.	Swap-out carrier(s)		Physically replace the center stage carrier (1D) with a port carrier, which will house the new ATM-EI circuit pack. ■ Remove ribbon cables and bus terminators. ■ Replace any vacant carriers with blank covers to ensure proper ventilation. **NOTE:** All other former-SNI carriers (for example 1E, 2D, 2E, 3D, 3E, and so on) can either remain vacant or be replaced by port carriers.		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	23.	Enable ATM-PNC	change system-parameters customer-options	Change the `Async.Transfer Mode (ATM) PNC` field to **y** on the Customer Options form (Screen 4-1 on page 4-12).		
	24.	Effect ATM-PNC change	Either: ■ log off and log back on ■ newterm	This effects the ATM-PNC change to the customer options.		
	25.	Re-administer carriers	change cabinet <*number*>	Administer the new port carriers as **port**.		
	26.	Insert ATM interface circuit packs		Insert TN2305X/TN2306X circuit packs into the new port carrier (1D) and in port carriers from which you have removed Expansion Interface (TN570) circuit packs. If the customer elected not to install a 1E port carrier, you will also need to install an ATM-EI circuit pack in carrier 1C. If there is not an available slot in 1C, you might need to move another 1C circuit pack to 1D to make room for the ATM-EI circuit pack.		
	27.	Connect fiber-optic cabling		Physically connect fiber-optic cabling between the ATM circuit pack(s) and the ATM switch(es).		Y

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	28.	Power up carrier(s)		Power up the carrier(s) by replacing the plugs on the power supplies. Wait approximately 2 minutes for each ATM circuit pack to boot. If the fiber-optic cabling is properly connected and the MAC address button is firmly in place, all LEDs on the circuit pack should be dark. This indicates that the circuit pack has ■ SONET framing with the ATM switch. ■ completed ILMI registration and detected no errors.		
	29.	Administer ATM circuit packs	change circuit-packs	Add the TN2305X/TN2306X circuit pack administration to each new port network.		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	30.	Administer ATM-PNC	add atm pnc *n* (n = the PN number for consistency)	Administer the following fields: `Name`: ATM switch port information. `Location`: UCCSS location `ESI`: MAC address from ATM switch `E.164`, `HO-DSP`, and `SEL` from ATM switch (refer to worksheets). **NOTE:** If the site does not use E.164, you will probably administer the `ICD` or `DCC` instead. **NOTE:** The administered address of ATM ports and the MAC address for the ATM circuit packs in PN cabinets *must match exactly*. Double check this administration before proceeding.		Record the ESI (MAC) address(es) of TN2305X/TN2306X circuit pack(s).
	31.	Enable PNC duplication	change system-parameters duplication	Change the `Enable Operation of PNC Duplication` field to **y**.		
	32.	Check links	list system-link	Ensure that the links are up. This can take several minutes.		
	33.	Check health	status pnc	Is `State of Health` field functional for both PNCs? Resolve any alarms.	Screen 4-2 on page 4-12	

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	34.	Change synchronization source	change synchronization	Administer these fields: ■ `Stratum` - enter the Stratum clock number ■ `Primary` - UCCSS address of the primary synchronization source ■ `Secondary` - UCCSS address of the secondary synchronization source **NOTE:** The primary and secondary addresses are for reference only. They do not affect the system behavior, but indicate the location of the synchronization splitters.		
	35.	Place test calls		Make a few A-PNC inter-port network calls using every port network. Verify two-way talk paths for each call. **NOTE:** Having the links come up (Step 32) does not ensure that the PPN administration and addressing is correct; only test calls using the PPN can verify proper administration.		
	36.	Perform PNC interchange (Critical reliability only)	reset pnc-interchange	Switches call processing to the B-PNC.		

Continued on next page

Table 4-2. Upgrading DEFINITY Server R CSS Release 10 to Avaya MultiVantage ATM-PNC (Continued)

√	Step	Action	Command	Description	More information	Site-specific comments
	37.	Place test calls (Critical reliability only)		Make a few B-PNC inter-port network calls using every port network. Verify two-way talk paths for each call. **NOTE:** Having the links come up (Step 32) does not ensure that the PPN administration and addressing is correct; only test calls using the PPN can verify proper administration.		
	38.	Perform PNC interchange (Critical reliability only)	reset pnc-interchange	Switches call processing back to the A-PNC. **NOTE:** This step assumes that the A-PNC will be the active side for normal operation.		
	39.	Enable synchronization switching	enable synchronization-switch	Enable switching to secondary synchronization source.		
	40.	Reinstate alarm origination and scheduled maintenance	change system-parameters maintenance	Ensure that the ■ Change the `Alarm Origination to OSS Numbers` field to its original value ■ Enable Scheduled Maintenance.	Screen 4-1 on page 4-12	
	41.	Save translations	save translation	Copy translations to the system disk (about 2 minutes).		
	42.	Back up disk	backup disk	Back up translations to the removable media. This takes about 15 minutes.		

Administration screens

```
change system-parameters maintenance                    Page   1 of   2   SPE B
                  MAINTENANCE-RELATED SYSTEM PARAMETERS
OPERATIONS SUPPORT PARAMETERS
            Product Identification: 1501137003
         First OSS Telephone Number:                    Abbrev Alarm Report? y
       Second OSS Telephone Number:                     Abbrev Alarm Report? n
  Alarm Origination to OSS Numbers: neither
        Cleared Alarm Notification? n                 Suspension Threshold: 5
              Restart Notification? n
           Test Remote Access Port? n
         CPE Alarm Activation Level: none
     Customer Access to INADS Port? n
       Repeat Dial Interval (mins): 7
SCHEDULED MAINTENANCE
                  Start Time: 01 : 00                   Stop Time: 01 : 01
           Daily Maintenance: daily              Save Translation: no
 Control Channel Interchange: daily     System Clocks Interchange: daily
             SPE Interchange: daily
```

Screen 4-1. Maintenance-related system parameters

```
status pnc
                          PORT NETWORK CONNECTIVITY

                                Duplicated? no
                              Software Locked?
                               Standby Busied?

                             Standby Refreshed?
                           Interchange Disabled?

             A-PNC                                  B-PNC

             Mode: active                           Mode:
   State of Health:                       State of Health:
    Inter PN Index:                        Inter PN Index:

      Major Alarms: 0                        Major Alarms:
      Minor Alarms: 0                        Minor Alarms:
    Warning Alarms: 0                      Warning Alarms:
```

Screen 4-2. Port network connectivity

```
change cabinet 1                                          Page   1 of   1   SPE B
                                    CABINET
 CABINET DESCRIPTION
                  Cabinet: 1
            Cabinet Layout: five-carrier
              Cabinet Type: processor
   Number of Portnetworks: 1
                     Room:
                    Floor:
                 Building:
 CARRIER DESCRIPTION
   Carrier       Carrier Type        Number     Duplicate
      C        port                 PN  01
      B        processor            PN  01
      A        processor            PN  01
      X        Fan
      D        dup-sw-node          SN  01       01E
      E        switch-node          SN  01       01D
```

Screen 4-3. Cabinet

```
change atm pnc 1
                                    ATM PNC

                                Connection Number: 1

              A-PNC                                    B-PNC

      Location: 01B02                          Location: 01B02
          Name:                                    Name:

Address Format: ICD ATM                  Address Format: ICD ATM

           AFI: 47                                  AFI: 47
           ICD: 0005                                ICD: 0005
        HO-DSP: 80FFE1000000F2071B02             HO-DSP: 80FFE1000000F2071B02
           ESI: 000000000000                        ESI: 000000000000
           SEL: 00                                  SEL: 00
```

Screen 4-4. ATM PNC

```
change synchronization                                  Page   1 of   6   SPE A
                          SYNCHRONIZATION PLAN
            SYNCHRONIZATION SOURCE (circuit pack location)
                    Stratum: 4
                    Primary: ATM-SW     Secondary: ATM-SW
Location    Name      Slip              Location    Name      Slip
02A17 g3rs-1e20        n                03B20 r2v6-0318        n
03D20 r2v6-tg86-isdn   n                03E20 ds1-r2v5-20305   n
01C20 isdn-r2v5-1e13   y                02C20 r2v5-1e10  xxx   n
02D20 ISDN- G3i        n                04A17 ds-1 to s75 v2   n
04B16 N3-isdn-2c19     n                01C19 nod2-g3s-1b15    y
03B17 g3s-isdn-1c16    n                02B20 Spare            n
03D19 wdbnd #1 L2      n                01C17 spare            n
NOTE: DS1 and BRI TRUNK sources result in stratum 4, type II synchronization
```

Screen 4-5. Synchronization plan

```
change system-parameters customer-options                       Page   2 of   6
                                OPTIONAL FEATURES

    Abbreviated Dialing Enhanced List? y                      CAS Branch? y
        Access Security Gateway (ASG)? y                        CAS Main? y
        Analog Trunk Incoming Call ID? y                 Change COR by FAC? n
 A/D Grp/Sys List Dialing Start at 01? y  Cvg Of Calls Redirected Off-net? y
Answer Supervision by Call Classifier? y                       DCS (Basic)? y
                                   ARS? y                 DCS Call Coverage? y
                 ARS/AAR Partitioning? y                DCS with Rerouting? y
              ARS/AAR Shortcut Dialing? n             DEFINITY Network Admin? y
                                                  Digital Loss Plan Modification? n
       ASAI Proprietary Adjunct Links? y                            DS1 MSP? y
       Async. Transfer Mode (ATM) PNC? y     Emergency Access to Attendant? y
  Async. Transfer Mode (ATM) Trunking? y             Extended Cvg/Fwd Admin? y
                                   ATMS? y       External Device Alarm Admin? y
                  Attendant Vectoring? n                   Flexible Billing? y
               Audible Message Waiting? y     Forced Entry of Account Codes? y
                   Authorization Codes? y        Global Call Classification? y


        (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 4-6. Optional features—page 2

Administering ATM-PNC and ATM-CES

5

After the hardware is upgraded for Avaya MultiVantage™ software on a DEFINITY ATM-PNC or ATM-CES, you must administer the ATM switch and the Avaya DEFINITY® Server to finish the process. Administration procedures are:

- Accessing Switches for Administration
- Acquiring ATM Addresses
- Administering ATM Switch
- Administering DEFINITY Server.

Accessing Switches for Administration

To access the DEFINITY Server and ATM switches for administration, you must have one of the following setups:

- Management terminal
- Laptop/PC with Avaya Site Administration (ASA)

The management terminal has been the traditional method for accessing DEFINITY Servers; however, it is no longer being offered or supported. Field technicians can use laptops or Windows-based PCs to administer the switch.

ASA (formerly DSA) is a software-only system management tool that runs on a personal computer using Microsoft Windows 95/98 or Windows NT 4.0. It is designed for a single user to administer and monitor DEFINITY Servers and associated voice mail systems. The software is available on laptops.

Although these methods of access present different interfaces, the command syntax is the same. The screens shown in this section are as they look on a DEFINITY Server R platform through a SAT. Your interface and screen page numbers may differ.

Acquiring ATM Addresses

Equipment that interfaces with an ATM switch must have a unique 40-digit (20-byte) ATM address. These 40 characters are divided into sectors as Table 5-1 shows:

Table 5-1. ATM addressing

Hex digit position	Length (hexadecimal)	Description
1-26	26	Network prefix that identifies a particular ATM switch in the network.
27-38	12	End system identifier (ESI) identifies each end-station connected through an ATM switch.[1]
39-40	2	Selector byte is always 0 for DEFINITY ATM

1. The ESI is usually the IEEE Media Access Control (MAC) address programmed into the end-station device during its manufacture. The MAC address on the TN2305X/TN2306X is located on the MAC address button on the circuit pack.

In Release 7 or later software, the address of the EPN is automatically derived by the local ATM switch using the address registration procedure defined in the Integrated Local Management Interface (ILMI). The ATM switch uses its 13-byte network address plus the 6-byte ESI, or MAC address, and the 1-byte selector byte of the corresponding TN2305X or TN2306X board(s) in the EPN to formulate the 20-byte ATM address(es).

ATM switches can use any of the address formats listed in Table 5-2 on page 5-3.

NOTE:
The beginning AFI and the last 2 sectors (ESI, and Selector) in Table 5-2 on page 5-3 are all the same length, making it easier to parse the ATM address, regardless of the format.

Table 5-2. ATM address formats

Format	Length (hex characters)	Description (high to low order)
Data Country Code (DCC)	2	Address Format Identifier (AFI) (39 for DCC)
	4	Data Country Code
	20	High-Order Domain Specific Part (HO-DSP)
	12	End System Identifier (ESI)
	2	Selector
International Code Designator (ICD)	2	Address Format Identifier (AFI) (47 for ICD)
	4	International Code Designator
	20	High-Order Domain Specific Part (HO-DSP)
	12	End System Identifier (ESI)
	2	Selector
ISDN E.164	2	Address Format Identifier (AFI) (45 for E.164)
	16	E.164 address
	8	High-Order Domain Specific Part (HO-DSP)
	12	End System Identifier (ESI)
	2	Selector

Administering ATM Switch

To administer the ATM switch, refer to your switch's quick reference guide. To get a copy of the guide, go to the Avaya web site (http://www.avaya.com) and click on Support, then find the page for your Avaya ATM solution.

Administering DEFINITY Server

The DEFINITY ECS switch software provides 2 kinds of ATM service:

- ATM Port Network Connectivity (ATM-PNC)
- ATM Circuit Emulation Service (ATM-CES)

Table 5-3 outlines important concepts to observe when administering ATM.

Table 5-3. General DEFINITY Server ATM parameters

Concept	Description
PNC duplication	If you are installing or upgrading a critical reliability system, the PNC duplication on the Customer Options screen must be turn on in the License File before the feature can be used. If it is enabled, you must further ■ Add **pnc-a** or **pnc-b** to command strings to clarify which carrier the ATM interface circuit pack is in ■ Specify the location of the ATM interface circuit pack serving as the duplicate The ATM interface circuit pack in the A carrier must be in the same port network as the B carrier. If not, an alarm is issued. You need not administer ATM interface circuit packs serving as backups to each other with the same parameters.
Fiber links	You do not need to administer fiber links for ATM-PNC. Information on the ATM circuit pack screen identifies which packs are used for PNC (endpoint-1), and endpoint-2 is administered on the ATM switch.
Remote switch administration	A remote switch connected with a permanent virtual circuit (PVC). The DEFINITY Server recognizes the remote switch as a node with compatible circuit parameters at the other end of an emulated circuit. You can connect a remote switch to the DEFINITY Server with one or more CES-emulated circuits. In such a case, the emulated circuits remain discrete.
Synchronization	PNC—All synchronization is derived from the ATM switch providing port connectivity. The ATM switch obtains synchronization from either a sync splitter attached to one or two DS1 cards or from the ATM network. CES—Synchronization is derived the same way it is in a non-ATM-PNC or ATM-PNC environment, whichever applies.

ATM Port Network Connectivity (ATM-PNC)

Each DEFINITY Server port network must be translated in the PPN's screen with the full ATM address (The ATM switch prefix, plus the port network's ESI, plus a Selector of 0) that uniquely identifies it.

Use the procedure in Table 5-4 to administer ATM-PNC:

Table 5-4. ATM-PNC administration

√	Step	Action	Command	Description
	1.	Log on to the DEFINITY Server switch		Use the `init` login to log on to the DEFINITY switch. **NOTE:** An **init** login is required to change customer options and will be challenged by Access Security Gateway (ASG). Contact your regional CSA (customer software administrator) to perform this function.
	2.	Log onto the DEFINITY Server		Use the `craft` login to log on to the DEFINITY Server (and ignore any alarms at this time).
	3.	Administer ATM PNC		Use the ATM worksheet in Appendix A, "Baselining the Customer's Configuration" to record the configuration.
	4.	Add new PNC	add pnc next	Add the next PNC.
	5.	Set location address		Set the `Location:` field to the address of the ATM circuit pack (in **01C01** - cabinet, carrier, slot format).
	6.	Assign network name		Type a name in the `Name:` field to assign a unique, 15-character port network name.
	7.	Set the MAC address (Steps 10-13)		Set `Address format` to one of the following: `E.164 ATM private`, `DCC`, or `ICD` **NOTE:** If other ATM applications are installed ask the ATM system administrator to determine which address format to use. The system default is DCC.
	8.	Fill in information from worksheet		Set `HO DSP:` **xxxxxxxx,** fill in information from the ATM worksheet (Appendix A, "Baselining the Customer's Configuration").

Continued on next page

Table 5-4. ATM-PNC administration (Continued)

√	Step	Action	Command	Description
	9.	Enter the ESI address		Type in the ESI from the ATM worksheet (Appendix A, "Baselining the Customer's Configuration") (MAC address) of the TN2305X/TN2306X in the EPN. **NOTE:** The first 13 bytes auto set after initial entry. Just enter the MAC address from each column for each TN2305X/TN2306X circuit pack.
	10.	Set the Sel field		Set the Sel: field to **00**. **NOTE:** Steps 11-13 make up the 20-byte ATM address.
	11.	If duplicated PNC (critical reliability), enable PNC	change system-parameters duplication	Set `Enable Operation of SPE Duplication?` field to **y** Set `Enable Operation of PNC Duplication?` field to **y** (Screen 5-4 on page 5-18)
	12.	Repeat for all PNs		Repeat Steps 7-13 until all port networks are administered.
	13.	Check administration	list atm pnc	Verify that all ATM connections are administered.
	14.	Check links	list sys-link	Types EAL (EPN) and PACL (all PNs) should display.
	15.	Administer the DEFINITY Server synchronization	change synchronization	Synchronize all signals.
	16.	Set primary timing reference		Set `primary`: **atm-sw**.
	17.	Set secondary timing reference		Set `secondary`: **atm-sw**. Press Enter to effect the changes.
	18.	Save translations	save translations	Save translations to system disk.

ATM Circuit Emulation Service (ATM-CES)

ATM Circuit Emulation Service (ATM-CES):

- Can be administered
  - — as an ATM-CES direct connect
  - — through an ATM network using PVCs

  Both procedures are in Table 5-8, under ''ATM-CES administration procedure'' on page 5-12.
- Uses ATM emulated circuits instead of physical T1/E1 tie-trunks out to the ATM network.
- Uses up to 8 signaling groups per TN2305X/TN2306X to create virtual trunking.
- Uses bearer (B) and signaling (D) channels, similar to ISDN facilities but does not support nonfacility associated signaling (NFAS).
- Uses channels inside each signaling group, which appear as if they were ports on the TN2305X/TN2306X circuit pack. Hereafter, these are referred to as ports.
- Uses constant bit-rate (CBR) signalling over permanent virtual connections (PVCs).
- Has a transparent DEFINITY feature set to other locations through narrowband QSIG (N-QSIG) or distributed communications system over ISDN-PRI (DCS+)

  NOTE:
  Because ATM trunks always appear as ISDN-emulated trunks, they do not support DCS, only DCS+.

ATM-CES rules

Table 5-5 lists several guidelines for ATM-CES administration.

Table 5-5. ATM-CES administration rules

Rule	How to administer or confirm
Both ends of the emulated circuit must have the same number of channels	Type **change signaling-group *siggrpnbr*** and press Enter; go to screen 2
Both ends of the emulated circuit must have the same number of trunks.	Type **change trunk-group *trkgrpnbr*** and press Enter; go to screen 6.
Both ends of the emulated circuit must use the same channel numbers.	Type **change signaling-group *siggrpnbr*** and press Enter; go to screen 2. In the port-to-channel mapping, use the same channel numbers for both ends of the trunk.
Each end of the trunk may use different port numbers on the respective ATM circuit packs.	Type **change trunk-group *trkgrpnbr*** and press Enter; go to screen 6. The same port numbers on the circuit packs need not be used on the two ends of the emulated circuit.
The maximum number of emulated circuits (signaling groups) on a single TN2305 circuit pack is 8.	A circuit pack can have more than one signaling group and more than one D-channel. The D-channel from one emulated circuit cannot signal for the bearer channels of another emulated circuit (no NFAS for virtual circuits).
A minimum of 7 ports must be administered for each emulated circuit (signaling group).	Because this includes the D-channel, at least 6 B-channels and the D channel must be administered in a signaling group.

Continued on next page

Table 5-5. ATM-CES administration rules (Continued)

Rule	How to administer or confirm
The D channel must be in a port between 009 and 032.	Type **display signaling-group *siggrpnbr*** and press Enter; go to screen 2 to verify. The D channel is automatically populated in channel 24 (T1) or in channel 16 (E1).
The TN2305X/TN2306X circuit packs provide up to 248 ports for trunking.	A circuit pack has 256 ports, but ports 1 through 8 are reserved for future use. Of the 248 available ports, 8 are for D-channels, and 240 are for B-channels. See Table 5-6 and Table 5-7 on page 5-10 for details about port and trunk group capacities for the TN2305X/TN2306X circuit pack and the DEFINITY Server.
A trunk group may contain either ISDN trunks or ATM trunks, but not both	

Table 5-6. TN2305X/TN2306X CES trunk capacities

Bearer ports per signaling group (B channel)	Signaling groups per TN2305X/TN2306X (D-channel)	Total ports used [1]
T1: 23	8	192
E1: 30	8	248

1. The circuit pack provides 256 ports, but ports 1 through 8 are reserved for future use.

Table 5-7. DEFINITY Server trunk capacities by model

Capacity	c, csi, si	r
Maximum trunks per trunk group	99	255
Maximum number of trunk groups	99	666
Maximum number of trunks in the system	400	4000

Trunk groups

At least one trunk group is typically created for each remote switch with these attributes (see Screen 5-8 on page 5-20):

- `Group Type` field `is` **isdn**
- `Carrier medium` field `is` **atm**
- `Dial Access?` field is always **n**
- TN2305X/TN2306X may have Trunk Access Codes (TAC), but these are for reporting purposes only and cannot be dialed.
- CDR records for ATM trunk calls are maintained.

  NOTE:
  Release 7 introduced 3-digit port numbers for administering a CES trunk, and some CMS releases cannot read the old 2-digit numbers. Release 10 and later of the CentreVu™ Call Management System (CMS) software can read both the 2- and 3-digit port numbers.

- A trunk group may include ports from more than one of the ATM circuit packs in the system. This enables *same module preference*, the feature that gives preference to outgoing trunks on the same port network as the originator.
- ATM trunk groups can only contain ports on ATM boards, and ports on ATM boards cannot be assigned to non-ATM trunk groups.

ATM-CES trunk board

When administered as a trunk board, the TN2305X/TN2306X can have up to 8 ATM signaling groups with up to 30 members per signaling group over an OC-3/STM-1 connection. Although the ATM board does not have physical ports, software makes the ATM board appear as if it does. Multiple TN2305X/TN2306X circuit packs in a port network could connect to different ATM switches.

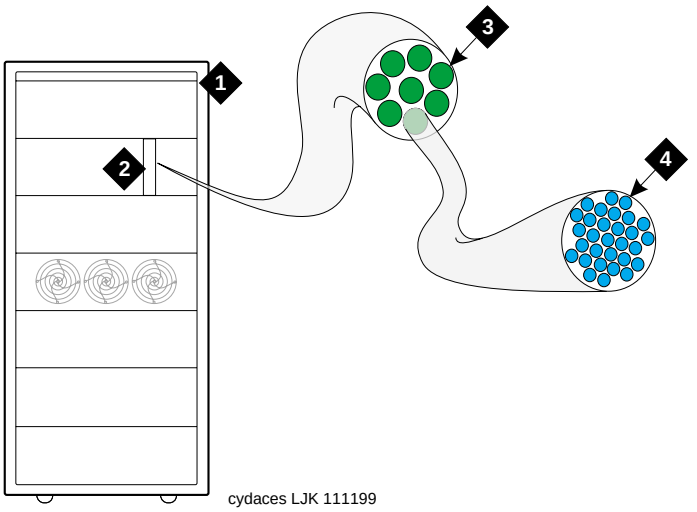

Figure Notes

1. DEFINITY Server PPN or EPN
2. TN2305X/TN2306X circuit pack in any port
3. Signaling groups (maximum 8)
4. Ports
   24 maximum (T1), including D-channel
   31 maximum (E1), including D-channel

Figure 5-1. DEFINITY signaling groups and members for ATM trunking

- Each of the 248 ports in the ATM trunk group are either B-channels or D-channels.
- Each B-channel has an associated maintenance object with a very simple maintenance strategy. This is done so that any of the virtual ports on a single ATM interface circuit pack can be members of different trunk groups. When a trunk group is busied out, only those ports in that trunk group are taken out of service. Because all ports associated with a single D-channel follow the same PVC, you cannot test them individually.

ATM-CES administration procedure

Table 5-8 contains ATM-CES administration for

- ATM signaling groups
- ATM-CES direct-connect configurations (two CES circuit packs linked by fiber, with no intervening switches). Observe the note in step 16.

NOTE:
The screens shown are for an Avaya DEFINITY Server R. The screen numbers may differ for DEFINITY Servers C, CSI, and SI.

Table 5-8. ATM-CES administration

√	Step	Action	Description
	1.	Check the customer options	Type **display system-parameters customer-options** and press Enter. The Customer Options screen (Screen 5-2 on page 5-17) displays.
	2.		Upgrades only: Ensure that the `G3 Version` field is **V10**. Go to screen 2.
	3.		Ensure that the `Async. Transfer Mode (ATM) Trunking`? field is **y** (Screen 5-2 on page 5-17). Go to screen 3.
	4.		Ensure that the `ISDN-PRI` field is **y** (Screen 5-3 on page 5-17).
	5.	Install the circuit packs	Install the TN2305X/TN2306X circuit pack and wait for it to initialize (about 4 minutes)
	6.	Connect the fiber optic cable	Attach the fiber optic cable to the circuit pack and to the ATM switch.
	7.	Look up ATM circuit pack locations	Type **list configuration atm** and press Enter. The name for this circuit pack appears as ATM INTERFACE (or ATM INTF).
	8.	Administer the circuit pack personality	Type **add atm trunk-board *UUCSS*** and press Enter. The ATM Trunk-Board screen (Screen 5-5 on page 5-18) displays.
	9.	Type a name for the ATM board	Type the name of the ATM interface circuit pack (15 alphanumeric characters) in the `Name` field.

Continued on next page

Table 5-8. ATM-CES administration (Continued)

√	Step	Action	Description

	10.	Set the synchronization	Set the `Synchronization Capable` field to **n** (default).
			
			NOTE:
			Up to 44 boards may be designated synchronization capable on R and 3 boards on SI, CSI, or C. If you enter **y** in this field when the maximum number of boards has been designated, the system returns:
			
			`Maximum number of Synchronization Capable boards already administered`
			
			NOTE:
			If this ATM trunk circuit pack is a synchronization source, set the field to **y**. If you change the field to n when the circuit pack is administered as a synchronization source, the system returns:
			
			`Cannot remove synchronization source.`

	11.	Administer the signaling group	Type **add signaling-group** and press Enter. The Signaling Group screen (Screen 5-6 on page 5-18) displays. Set the following fields (tabbing goes vertically)
	12.	Set the group type	Set the `Group Type` field to **atm**.
	13.	Type port address	Type the `D-channel` (signaling channel) port address for this new signaling group in ***UUCSSppp*** screen at (3-digits required for port addresses). This address must match the slot and port number on an ATM-Interface circuit pack.
	14.	Type a name	Type a name in the `Name` field (15 alpha-numeric characters).
	15.	Set VPI	The `Virtual Path Identifier` (VPI) field is set to `0` and is not administrable.

Continued on next page

Table 5-8. ATM-CES administration (Continued)

√	Step	Action	Description
	16.	Set VCI	Set the `Virtual Channel Identifier` (VCI) field (32-1023). This number must be unique among signaling groups that share the same ATM circuit pack. **NOTE:** For a direct connection (two fiber-connected CES circuit packs), specify the same VCI at both ends of the emulated circuit. When the CES is connected to an ATM switch, the VCI specified here must match the VCI used for the PVC created on the ATM switch, which is typically provided by the ATM switch administrator. **NOTE:** The `Signaling Mode` field is set to `isdn-pri` and is not administrable.
	17.	Set idle code	Set the `Idle Code` field (typically 11111111).
	18.	Set interface companding	Set the `Interface Companding` field (**alaw** or **mulaw**). Once administered, busyout the signaling group before changing.
	19.	Set country protocol	Set the `Country Protocol` field (Table 5-9 on page 5-19).
	20.	Set protocol version	Set the `Protocol Version` field (Table 5-9 on page 5-19).
	21.	Set circuit type	Set the `Circuit Type` field (**T1** or **E1**). **NOTE:** Both ends must be the same. It is preferable to set it to E1 even in the United States, Canada, or other T1 countries.
	22.	Set connect	Set the `Connect` field to **pbx**. Once administered, busyout the signaling group before changing.
	23.	Set interface	Set the `Interface` field to **user** at one end of the emulated circuit and to **network** at the other end.
	24.	Set DCP/analog bearer capability	Set the `DCP/Analog Bearer Capability` field to **3.1 kHz**.
	25.	Set internetworking message	Set `internetworking message` field to **PROGress**.

Continued on next page

Table 5-8. ATM-CES administration (Continued)

√	Step	Action	Description
	26.	Verify channel settings	Go to screen 2; Screen 5-7 on page 5-20 displays. Depending on the settings in step 18: ■ If `Circuit Type` field is set at T1, then channel 24 is populated. ■ If `Circuit Type` field is set at E1, then channel 16 is populated. Other details about D-channels: ■ All ports for one signaling group must be on the same ATM circuit pack (the same circuit pack that the D channel is on). ■ The D-channel port is never assigned to a trunk group. Because they are all the same, the administrator does not need to type in the circuit pack location for each channel. ■ No port can be assigned to more than one signaling group.
	27.	Type port numbers	Add the port numbers (minimum of 6) from the port-to-channel mapping on signaling group screen 2. See ''Changing the port-to-channel mapping'' on page 5-22 if you need to change any administration. When finished, press Enter to save the administration.
	28.	Administer the trunk group	Type **add trunk-group [*trkgrpnbr* | *next*]** and press Enter. Screen 5-8 on page 5-20 displays.
	29.	Set final fields	Set the following fields (tabbing goes horizontally): ■ `Group Type:` field to **isdn**. **NOTE:** A trunk group can contain either ISDN or ATM trunks, but not both. ■ The `CDR Reports` field defaults to **y**. ■ The `Carrier Medium:` field to **ATM**. ■ The `TAC:` field to match customer's dial plan. ■ The `Dial Access?` field defaults to **n**. ■ The `Service Type:` field to **tie**.

Continued on next page

Table 5-8. ATM-CES administration (Continued)

√	Step	Action	Description
	30.		Go to screen 6 and add the channel-to-port mapping (Screen 5-10 on page 5-25). You must have the same number of entries as port numbers in step 28. Press Enter to effect the changes.
	31.	Save translations	Type **save translations** and press Enter.

ATM-CES administration screens

NOTE:
The screens shown in this section are as they look on a DEFINITY Server R through a SAT. Your interface and screen page numbers may differ.

```
display system-parameters customer-options                Page   1 of   6
                              OPTIONAL FEATURES

                  G3 Version: V10 Maximum Ports: 300
                 Location: 1              Maximum XMOBILE Stations: 0
                                               Maximum H.323 Trunks: 0
                                          Maximum H.323 Stations: 0
                                           Maximum IP SoftPhones: 0
```

Screen 5-1. Optional features—screen 1

```
display system-parameters customer-options                    Page   2 of   6
                              OPTIONAL FEATURES

    Abbreviated Dialing Enhanced List? y                      CAS Branch? y
        Access Security Gateway (ASG)? y                        CAS Main? y
        Analog Trunk Incoming Call ID? y                 Change COR by FAC? n
 A/D Grp/Sys List Dialing Start at 01? y  Cvg Of Calls Redirected Off-net? y
Answer Supervision by Call Classifier? y                      DCS (Basic)? y
                                   ARS? y                DCS Call Coverage? y
                 ARS/AAR Partitioning? y                 DCS with Rerouting? y
            ARS/AAR Shortcut Dialing? n            DEFINITY Network Admin? y
                                              Digital Loss Plan Modification? n
      ASAI Proprietary Adjunct Links? y                           DS1 MSP? y
      Async. Transfer Mode (ATM) PNC? y    Emergency Access to Attendant? y
  Async. Transfer Mode (ATM) Trunking? y           Extended Cvg/Fwd Admin? y
                                   ATMS? y      External Device Alarm Admin? y
                  Attendant Vectoring? n                 Flexible Billing? y
              Audible Message Waiting? y    Forced Entry of Account Codes? y
                  Authorization Codes? y       Global Call Classification? y


       (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 5-2. Optional features—screen 2

```
display system-parameters customer-options                    Page   3 of   6
                              OPTIONAL FEATURES

                    Hospitality (Basic)? y                PNC Duplication? y
         Hospitality (G3V3 Enhancements)? y
                           H.323 Trunks? n       Processor and System MSP? y
                             IP Stations? n              Private Networking? y
                      ISDN Feature Plus? y  Restrict Call Forward Off Net? y
                        ISDN-BRI Trunks? y          Secondary Data Module? y
                               ISDN-PRI? y          Station and Trunk MSP? y
                    Malicious Call Trace? y
    Mode Code for Centralized Voice Mail? n            Tenant Partitioning? y
                    Mode Code Interface? y    Terminal Trans. Init. (TTI)? y
                Multifrequency Signaling? y             Time of Day Routing? y
Multimedia Appl. Server Interface (MASI)? y           Uniform Dialing Plan? y
        Multimedia Call Handling (Basic)? y  Usage Allocation Enhancements? y
     Multimedia Call Handling (Enhanced)? y
                     Multiple Locations? y             Wideband Switching? y
           Personal Station Access (PSA)? y                       Wireless? y


       (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 5-3. Optional features—screen 3

```
display system-parameters duplication      Page   1 of   1   SPE B
                    DUPLICATION RELATED SYSTEM PARAMETERS




        Enable Operation of SPE Duplication? y

       Enable Operation of PNC Duplication? y
```

Screen 5-4. Duplication related system parameters

```
                          ATM TRUNK-BOARD

      Location: 2E08

          Name: _______________          Synchronization Capable: 1
```

Screen 5-5. ATM trunk board

```
add signaling-group                                          Page   1 of   6
                              SIGNALING GROUP

 Group Number: 2              Group Type: atm             Name:
                                                    Max number of NCA TSC: 0
                               D-Channel:             Max number of CA TSC: 0
                                                   Trunk Group for NCA TSC:
       Trunk Group for Channel Selection:
          Supplementary Service Protocol: a

 CIRCUIT PARAMETERS
       Virtual Path Identifier: 0
    Virtual Channel Identifier:

                Signaling Mode: isdn-pri              Circuit Type: T1
                     Idle Code: 11111111                   Connect: pbx
           Interface Companding: mulaw
               Country Protocol: 1
               Protocol Version: a
                                      DCP/Analog Bearer Capability: 3.1kHz
                                             Interworking Message: PROGress
```

Screen 5-6. Signaling group

Table 5-9. Country and protocol version supported (for Screen 5-6)

Value	Country	Protocol supported
1-a	United States, Canada	AT&T TR41449/41459 (tested with AT&T, Canadian, and MCI networks)
1-b	United States	Bellcore TR 1268; NIUF.302; ANSI T1.607
2	Australia	AUSTEL TSO14.1; Telecom Australia TPH 1856
3	Japan	NTT INIS-NET
4	Italy	ETS 300 102
5	Netherlands	ETS 300 102
6	Singapore	ETS 300 102
7	Mexico	ETS 300 102
8	Belgium	ETS 300 102
9	Saudi Arabia	ETS 300 102
10-a	United Kingdom	ETS 300 102 (for connection to DASS II/DPNSS through external converter)
10-b	United Kingdom	ETS 300 102 (Mercury) British Telecom ISDN 30
11	Spain	Telefonica ISDN Specification
12-a	France	VN4 (French National PRI)
12-b	France	ETS 300 102 modified according to P10-20, called Euronumeris
	Argentina	ETS 300 102
	Brazil	ETS 300 102
	China	ETS 300 102
	Germany	ETS 300 102
	Hong Kong	ETS 300 102
	South Korea	ETS 300 102
	New Zealand	ETS 300 102

```
add signaling-group next                                        Page   2 of   6
                                SIGNALING GROUP

 Chan Port Chan Port
 __1: ____  _17: ____
 __2: ____  _18: ____
 __3: ____  _19: ____
 __4: ____  _20: ____
 __5: ____  _21: ____
 __6: ____  _22: ____
 __7: ____  _23: ____
 __8: ____  _24: 0cc (T1 only)
 __9: ____
 _10: ____
 _11: ____
 _12: ____
 _13: ____
 _14: ____
 _15: ____
 _16: Occ (E1 only)
```

Screen 5-7. Signaling group D-channel assignments—screen 2

```
add trunk-group                                              Page   1 of  10
                                TRUNK GROUP

Group Number: 1                    Group Type: isdn          CDR Reports: y
  Group Name: OUTSIDE CALL                COR: 1        TN: 1        TAC:
   Direction: two-way        Outgoing Display? n         Carrier Medium: ATM
 Dial Access? n                Busy Threshold: 99          Night Service:
Queue Length: 0
Service Type: tie                    Auth Code? n             TestCall ITC: rest
                         Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
         Codeset to Send Display: 6     Codeset to Send National IEs: 6
        Max Message Size to Send: 260   Charge Advice: none
  Supplementary Service Protocol: a     Digit Handling (in/out): enbloc/enbloc

            Trunk Hunt: cyclical              QSIG Value-Added Lucent? n
                                                   Digital Loss Group: 13
Calling Number - Delete:     Insert:                 Numbering Format:
              Bit Rate: 1200         Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? n
 Answer Supervision Timeout: 0
```

Screen 5-8. Trunk group—screen 1

```
add trunk-group                                          Page   4 of  10
                                TRUNK GROUP
                                     Administered Members (min/max):   0/0
GROUP MEMBER ASSIGNMENTS                 Total Administered Members:   0

       Port    Code Sfx Name        Night           Sig Grp
  1:
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:
 11:
 12:
 13:
 14:
 15:
```

Screen 5-9. Trunk group—screen 4

Changing the port-to-channel mapping

Use the following steps to change the port-to-channel mapping for emulated circuits:

1. Type **busyout atm signaling-group *siggrpnbr*** and press Enter to busyout the signaling group.
2. Type **change trunk-group *trkgrpnbr*** and press Enter.

   Remove any port administration on screen 6.
3. Type **change signaling-group *siggrpnbr***.

   Modify the port-to-channel mapping.
4. Type **change trunk-group *trkgrpnbr*** and press Enter.

   Add the ports back in on screen 6, using new port numbers, if desired.
5. Type **release atm signaling-group *siggrpnbr*** and press Enter to release the signaling group.

   The display shows the command aborts, but the D-channel and B-channels come up.

DEFINITY commands for CES

Administration commands that are useful in working with CES are listed in Table 5-10.

Table 5-10. ATM administration commands

Command	Description
display circuit-packs *cabinet*	Displays the packs in the cabinet, identifying ATM Trunk as well as ATM PNC EI boards. ATM Interface boards have not been specified as CES or PNC yet.
display atm ports *eqloc*	Displays the 256 ports on the ATM board with the corresponding signaling and trunk group.
list configuration atm	Lists the ATM boards, identifying equipment location, board code, type, and vintage.
list configuration trunks	Lists boards identifying assigned ports. Although the ATM board is listed, the 256 ports are not.

Additional DEFINITY Server administration

After administering the ATM-PNC or ATM-CES, you may need to do some further administration, specifically:

- Locations
- SVC cache (PNC only)
- Gain/Loss adjustments (PNC only).

Locations

The DEFINITY ATM-PNC makes it easier for the DEFINITY Server to have port networks in multiple time zones. To handle distances between the PPN and its EPNs, the system tracks one or more locations by assigning each cabinet a location number. All locations must be in the same country code.

If upgrading from a pre-Release 7, you may need to set the locations for your EPNs. To administer locations, follow the procedure in Table 5-11.

NOTE:
The screens and field description follow the table.

Table 5-11. Administer location procedure

√	Step	Action	Description
	1.	Check the customer options	Type **display system-parameters customer-options** and press Enter. The Customer Options screen displays. Go to screen 3 (Screen 5-10 on page 5-25).
	2.		Ensure that the `Multiple locations` field is **y**. **NOTE:** The system is limited to a single location unless this field is **y**.
	3.	Change cabinet administration	Type **change cabinet n** (cabinet number) and press Enter. The Cabinet screen displays (Screen 5-11 on page 5-26).
	4.	Administer cabinet location	Each cabinet in the switch and the port network(s) in that cabinet must be assigned a location number (default location number is 1). Change the `Location` field to the appropriate number and press Enter.

Continued on next page

Table 5-11. Administer location procedure (Continued)

√	Step	Action	Description
	5.	Administer location properties	Type **change locations** and press Enter. The Locations screen displays (Screen 5-12 on page 5-27).
	6.	Set timezone offset	Ensure that the `Timezone Offset field for` Location 1 is set at **00:00**, indicating the local time. This serves as a system-wide, relative time reference.
	7.	Set Number Plan Area Code	The `Number Plan Area Code` field (for subnet trunking conversions between 10-digit North American Number Plan (NANP) and 7-digit (local) numbers. Leaving the field blank is the normal setting for a location ■ outside the NANP. ■ with no 7-digit local calling plan. These locations may have overlayed area codes requiring10-digit dialing.
	8.	Administer cabinet locations	Administer all other locations as necessary. For example, if the PPN is in New York and a group of EPNs is in Los Angeles, then New York (location 1) is the reference and is administered with no time offset (see step 8). Los Angeles (location 2) is 3 hours earlier than New York time and is administered with a time offset of -03:00. Administer cabinet locations as they are added to the system. More than 1 cabinet can be in the same location. For location-related feature limitations and interactions see Table 5-11. When finished, press Enter to effect the changes.
	9.	Administer Daylight-Savings Time rules	Type **change daylight-savings-rules** and press Enter. The Daylight Savings Rules screen displays (Screen 5-13 on page 5-28). Administer as many rules as necessary for all of the administered locations. If you want to deny access for an individual login: ■ set the `Additional Restrictions` field for that login to **y**, and entering **daylight-savings-rules** in the `Restricted Object List` field. ■ set the `Administer Features` field for that login to **n**. ■ set the `Display Admin. and Maint. Data` field for that login to **n**.

Continued on next page

Table 5-11. Administer location procedure (Continued)

√	Step	Action	Description
	10.	Verify date and time	Check the system date and time (set time). Ensure that the `Type` and `Daylight Savings Rule` fields are administered correctly (Screen 5-14 on page 5-29).
	11.	Administer ARS routing	Administer the `Location` field on the ARS analysis screen (**change ars analysis 0 location all**), observing the following conditions: ■ ARS customer option (**display system-parameters customer-options**) must be enabled. ■ The Multiple Locations customer option must be administered to a value other than **all**.

```
display system-parameters customer-options                      Page   3 of   6
                              OPTIONAL FEATURES

                    Hospitality (Basic)? y                PNC Duplication? y
         Hospitality (G3V3 Enhancements)? y
                             H.323 Trunks? n       Processor and System MSP? y
                              IP Stations? n              Private Networking? y
                        ISDN Feature Plus? y  Restrict Call Forward Off Net? y
                          ISDN-BRI Trunks? y          Secondary Data Module? y
                                 ISDN-PRI? y          Station and Trunk MSP? y
                    Malicious Call Trace? y
    Mode Code for Centralized Voice Mail? n            Tenant Partitioning? y
                    Mode Code Interface? y    Terminal Trans. Init. (TTI)? y
                 Multifrequency Signaling? y             Time of Day Routing? y
Multimedia Appl. Server Interface (MASI)? y           Uniform Dialing Plan? y
        Multimedia Call Handling (Basic)? y  Usage Allocation Enhancements? y
     Multimedia Call Handling (Enhanced)? y
                      Multiple Locations? y             Wideband Switching? y
           Personal Station Access (PSA)? y                       Wireless? y


        (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 5-10. Optional features—screen 3

```
change cabinet 1                                                Page 1 of 1

                                CABINET

 CABINET DESCRIPTION
                  Cabinet: 1
            Cabinet Layout: five-carrier
              Cabinet Type: processor
    Number of Portnetworks: 1

                  Location: 1

                      Room:             Floor:          Building:

 CARRIER DESCRIPTION
   Carrier       Carrier Type        Number

       C        not-used            PN 01
       B        not-used            PN 01
       A        processor           PN 01
       X        fan
       D        not-used            PN 01
       E        not-used            PN 01
```

Screen 5-11. Cabinet

NOTE:
With Release 7.1 or later software, all cabinets are automatically assigned location 1.

Field description:

`Location` Location number associated with the cabinet (range is 1-44, default 1).

- Field cannot be blank
- Location is display-only if the `Multiple locations` field (**change system-parameters customer-options**) is not set to **y**.

```
change locations                                              Page 1 of 3

                                LOCATIONS

                  ARS Prefix 1 Required For 10-Digit NAMP Calls? y

 Number   Name              Timezeone  Daylight-Savings        Number Plan
                             Offset    Rule                    Area Code
   1      Main              + 00:00    0
   2                             :
   3                             :
   4                             :
   5                             :
   6                             :
   7                             :
   8                             :
   9                             :
  10                             :
  11                             :
  12                             :
  13                             :
  14                             :
```

Screen 5-12. Locations—screen 1

NOTE:
Upgrades from a previous software version default to a single location (location 1) with the values shown in Screen 5-12. The `Number Plan Area Code` is the home NPA from the dial plan screen of the earlier release.

Field description:

`ARS Prefix 1 Required For 10-Digit NANP Calls?`
This field is set to **y** if all 10-digit NANP calls (those marked as FNPA in the ARS analysis tables) must be preceded by a digit '1' (commonly called the toll prefix); otherwise, it is set to **n**.

NOTE:
Many areas in the United States have changed to 10-digit dialing for local calls, and administration for this field and the ARS analysis entries must reflect these changes.

`Number`
This read-only field uniquely identifies a location. Valid values range from 1 to 44.

`Name`
This15-character field identifies the location but may be blank for any given location (default = y).

`Timezone Offset`
This field specifies the time offset from the system standard time. Set a value in the ±, hour (0-23),and minute (0-59) areas, as these fields cannot be blank for an administered location.

Number	This field is the number assigned to the administered, customized rule (0 to 15) for this location. Each rule consists of the week, day, month, and time that daylight savings starts and stops. ■ Rule 0 is no daylight savings time and is not alterable. ■ Rule 1 defaults to the U.S. daylight savings time rule but may be altered or deleted.
Number Plan Area Code	This field is the numbering plan area code appropriate for this location (can be blank).

```
change daylight-savings-rules                                  Page 1 of 2

                        DAYLIGHT SAVINGS RULES

 Rule          Change Day                 Month  Date   Time    Increment

  0: No Daylight Savings

  1: Start: first Sunday     on or after April     1   at 2 :0    1 :0
     Stop: first Sunday      on or after October   25  at 2 :0
  2. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
  3. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
  4. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
  5. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
  6. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
  7. Start: first            on or after               at 0 :     0 :
     Stop: first             on or after               at 0 :
```

Screen 5-13. Daylight savings rules screen

Field description:

Change Day	The day of the week, or date that the change takes effect.
Month	The month the change takes effect.
Date	The date on or after which the change takes place.
Time	2 fields that specify the hour (0-23) and minute (0-59) that the change takes effect (in 24-hour format)
Increment	2 fields specifying the number of hours (0-23) and minutes (0-59) the clock is moved ahead to begin daylight savings time (and moved back to return to standard time).

NOTE:
Some states (Arizona) or portions of states (Indiana) do not observe daylight savings time. Verify the daylight savings time status in all your locations.

```
set time                                                        Page 1 of 1

                              DATE AND TIME

          DATE

            Day of the Week: Sunday          Month: October
           Day of the Month: 24               Year: 1999

          TIME

            Hour: 8  Minute: 16     Second: 31     Type: Standard
                      Daylight Savings Time Rule: 0

   WARNING: Changing the date or time will impact BCMS, CDR and MEASUREMENTS
```

Screen 5-14. Date and time screen

NOTE:
When the system clock is upgraded from an earlier release, the daylight savings time rule on the **set time** screen defaults to **0** (no rule). While you can change the daylight savings time rule, the system clock is not adjusted automatically until the next transition of the rule.

Field description:

`Type`	`Daylight-savings` = daylight savings time `Standard` = standard time
`Daylight Savings Rule`	The daylight savings time rule number (0 to 15). Rule 0 is no daylight savings time, and rule 1 defaults to U.S. daylight savings time rule.

SVC cache

DEFINITY ATM software maintains a cache of inter-port-network connections (SVCs), with the preference given to those SVCs with the longest setup times. All cached interconnections are aged to ensure that a large number of them are not kept during nearly idle periods.

You can administer the setup time thresholds, cache holding times, and total cache size, which can mitigate the effects of long interconnection setup delays.

NOTE:
Avaya strongly suggests you always leave the the cache algorithm set to the default of **lan**, except in highly unusual conditions. Internal testing has uncovered virtually no situations in which the default setting is not best. Therefore, experimentation on this screen is strongly discouraged.

The **change atm svc-cache** command (Screen 5-15) is restricted to init, inads, and craft logins.

```
change atm svc-cache                                          Page 1 of 1

                          ATM SVC CACHE

          Algorithm:                          Size: 410

                          ALGORITHM PARAMETERS

                       For Latency    Hold Time
                       >= 50     ms   36    sec
                       >= 0      ms   12    sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
                       >=        ms         sec
```

Screen 5-15. ATM SVC cache report

Field description:

`Algorithm` — The name of the cache algorithm (default is **lan**). Possible values are **none**, **lan**, **man**, **wan**, and **custom**. Please read the Note on page 5-30.

When this field is changed to **none**, **lan**, **man**, or **wan**, the read-only `For Latency` and `Hold Time` field values change to the following (all other entries are blank):

Value	For Latency (ms)	Hold Time (ms)
none	0	0
lan	50	36
	0	12
man	800	80
	50	16
	0	8
wan	800	200
	200	36
	50	16
	0	0

When this field is **custom**, none of the `For Latency` or `Hold Time` field values change, but the fields change from read-only to read/write. For example, if you want a slight variation of the wan algorithm, type **wan** first to set the above values, then type **custom** to change the individual parameters.

`Size` — The maximum number of entries simultaneously allowed in the cache (default = 410).

`For Latency` — These fields (10) are read-only if the `Algorithm` field is **none**, **lan**, **man**, or **wan**, but are read/write if `Algorithm` is **custom**. Defaults: **36** for the 1st entry, 0 for the second, blank for the last 8 entries.

Gain/Loss adjustments

Gain and loss are administrable. Calls between a digital (BRI or DCP) phone (6400 and 8400 series) and an analog trunk port require adjustments to the default gain/loss settings to prevent distortion. Use the procedure (Table 5-12 on page 5-32) to administer digital phones on ATM-PNC DEFINITY Servers.

NOTE:
Use the following procedure *only for Series 6400 or 8400 digital phones*.

Table 5-12. Gain/loss adjustment procedure

√	Step	Action	Description
	1.	Set or verify gain/loss administration	Type **change system-parameters country-options** and press Enter. The System Parameters Country-Options screen displays (Screen 5-16 on page 5-33).
	2.	Set digital loss plan	In the U.S.: Ensure that the `Digital Loss Plan` field is **1**. If it is, exit this procedure. Outside the U.S.: If the `Digital Loss Plan` field is anything other than 1, you must change the terminal parameters. Proceed to step 3.
	3.	Customize the digital phone series administration	Type **change terminal-parameters *termtype*** and press Enter. (***termtype*** can be **603/302B1**, ***6400*** or ***8400***.) See the 6400-Type Terminal Parameters example (Screen 5-17 on page 5-33) display (***6400*** used for this example). Change the `Default Parameter Set` field to **1**.
	4.	Change the settings	In the Primary Levels part of the screen, change the following fields to these settings: ■ `Voice Transmit (dB)` = **+2.5** ■ `Voice Receive (dB)` = **-2.0** *For 6400 and 8400 series phones only*: in the BUILT-IN SPEAKER LEVELS part of the screen, change the following fields to these settings: ■ `Voice Transmit (dB)` = **0.0** ■ `Voice receive (dB)` = **0.0** Press Enter.
	5.	If both series 6400 and 8400 digital phones are used	Repeat steps 3 and 4 for all of the applicable phone series connected to this switch, using **603/302B1**, ***6400*** or ***8400*** at the end of the command string. When finished, press Enter to effect the changes.

```
change system-parameters country-options                          Page   1 of   21

                    SYSTEM PARAMETERS COUNTRY-OPTIONS

              Companding Mode: Mu-Law              Base Tone Generator Set: 1
          440Hz PBX-dial Tone? n                 440Hz Secondary-dial Tone? n
            Digital Loss Plan: 1
       Analog Ringing Cadence: 1       Set Layer 1 timer T1 to 30 seconds? n
     Analog Line Transmission: 1
 64/84xx Display Character Set? roman
TONE DETECTOR PARAMETERS
          Tone Detection Mode: 6
             Interdigit Pause: short
```

Screen 5-16. System parameters country-options—screen 1

```
change terminal-parameters 6400                          Page   1 of   1   SPE A

                      6400-TYPE TERMINAL PARAMETERS

        Default Parameter Set: 1        Customize Parameters? y
 OPTIONS
                 Display Mode:
    Handset Expander Enabled?
                      Volume:
 PRIMARY LEVELS
          Voice Transmit (dB): 2.5
           Voice Receive (dB): 2.5
          Voice Transmit (dB):                 Voice Sidetone (dB):
    Touch Tone Transmit (dB):
          Voice Receive (dB):             Touch Tone Sidetone (dB):
 BUILT-IN SPEAKER LEVELS
          Voice Transmit (dB):                   Voice Receive (dB):
                                            Touch Tone Sidetone (dB):
 6402 BUILT-IN SPEAKER LEVELS
          Voice Receive (dB):             Touch Tone Sidetone (dB):
```

Screen 5-17. 6400-type terminal parameters

Final Checklist and Test

After you complete all the administration, you might want to run through a final checklist and verify that everything is working. This section contains a final installation checklist and a procedure for testing the installation.

Use Table 5-13 to make sure that the switch administration for both the ATM switch and DEFINITY Server is complete. Use Table 5-14 on page 5-35 and Table 5-15 on page 5-36 to test the ATM-PNC and ATM-CES installations, respectively.

Table 5-13. Final installation checklist

√	Switch administration	What to check		How to check
	ATM	1. A VPI or VCI is administered for each CES PVC		Query ATM switch
		2. Class of service is Constant Bit Rate (CBR)		Query ATM switch
		3. Quality of Service (QoS) is Peak Cell Rate (PCR)		Query ATM switch
	DEFINITY Server switch	1. ATM circuit packs inserted and translated		Query DEFINITY Server (list configuration atm)
		2. Signaling group for each PVC	a. Signaling group identifier	Query DEFINITY Server (status signaling group)
			b. Circuit pack ID	
			c. VPI/VCI	
			d. VC type is PVC	
			e. D-channel port number assigned properly	
			f. Signaling type (CES) administered	
			g. Minimum number of channels administered (total of 7, at least 1 must be a D channel)	
			h. D- and B-channel-to-port mapping	
		3. PVCs are up		Query DEFINITY Server (status signaling-group *n*). If signaling group is in service, then PVCs are up.
	ATM-PNC	1. ATM circuit packs installed and translated		Query DEFINITY Server
		2. ATM addresses are correct		Query DEFINITY Server
		3. EALs are up		Query DEFINITY Server (list system link)

Table 5-14. ATM-PNC installation test procedure

√	What to check	How to check	How to fix
	1. Check SONET/SDH layer for status and alarms.	Query alarms and hardware logs	
	2. Check the LEDs on the ATM circuit packs	Refer to the maintenance book for descriptions of the LEDs, their flash rates, and the conditions indicated.	
	3. Ensure that Expansion Archangel Links (EAL) are established to the EPNs	On the DEFINITY Server access terminal, type **list system link** and press Enter.	■ If the EAL is not up, check the ATM address for that TN2305X/TN2306X port network (**list atm-pnc**, then **display atm-pnc *n***). ■ If the ATM address is incorrect, enter the correct ATM address (**change atm-pnc *n***) and retest.
	4. Place test call to any EPN remoted through the ATM network.	Dial an administered number on a remoted EPN.	
	5. Verify synchronization	Query ATM switch to make sure it is in “locked” state	

Table 5-15. ATM-CES installation test procedure

√	What to check	How to check	How to fix
	1. Check SONET/SDH layer for status and alarms.		
	2. Check the LEDs on the ATM circuit packs	Refer to the maintenance book for descriptions of the LEDs, their flash rates, and the conditions indicated.	
	3. Temporarily disable any call overflows through administration across each CES trunk group.	Place test call to any EPN remoted through each signaling group. Make sure call completes and has a 2-way talk path.	
	4. Ensure CDR records properly, if enabled		
	5. Verify that ISDN features are working		

Troubleshooting

6

This chapter provides the following troubleshooting information:

- Contact information—Lists Avaya service organizations and helplines for U.S. and international installations
- Serviceability details the enhanced command and reports for more easily isolating and diagnosing ATM network problems. New reports, data, and automatic circuit pack reset command to help you and service organizations maintain ATM-network applications.
- Alarms and errors—Lists ATM maintenance objects and the platforms on which you can expect alarms and errors.
- Troubleshooting ATM-CES—Provides tips for troubleshooting DEFINITY Server and ONE ATM-CES interfacing with ATM switches.
- Troubleshooting ATM-PNC—Provides tips for troubleshooting DEFINITY Server ATM-PNC interfacing with ATM switches.

NOTE:
Information on troubleshooting specific ATM switches is found in your ATM switch's quick reference guide.

Contact information

Avaya service organizations

Table 6-1 lists initial contact information for Avaya's service and support. In cases where there is trouble and the customer cannot tell where it resides, call the Technical Service Organization (TSO) or Global Strategic Opportunities Division (GSOD) first.

Table 6-1. Avaya service organizations—initial contact information

Organization	Contact information
Technical Service Organization (TSO)	■ **Customers**: 1-800-242-2121 ■ **Technicians**: 1-800-248-1234 ■ **International**: Call your local direct or indirect channel partner
NetCare® Professional Services (NPS)	■ 1-800-237-0016 ■ http://www.networkcare.com
Data networking technical support	■ **Domestic**: 1-800-237-0016 (press 0 at the prompt, then dial extension 73300) ■ **Outside the USA**: 1-813-217-2425.
Avaya ATM switches Services & Solution Delivery support	■ http://infohub.mt.avaya.com/ (choose *Product Index*) or ■ http://ndsspl.lc.avaya.com/netcareservicesrd/documents/ssplans/
DEFINITY Server switch Services & Solution Delivery support	■ http://www.bcs.avaya.com/solution/support_plans/#DEFINITY
Global Strategic Opportunities (GSO) Division	■ http://www-nsod.tsc.bcs.avaya.com

Helplines

Table 6-2 lists various HelpLine organizations that handle postsale maintenance and general usage questions.

Table 6-2. Helpline information

		US and Canada	
Organization		**Direct**	**Indirect**
CES	DEFINITY Helpline	1-800-225-7585	1-800-225-7585
	Maintenance	1-800-242-2121 (TSC)	1-800-242-2121 (TSC)
INS	Helpline	1-800-237-1616	Call distributor or maintenance provider
	Maintenance	1-800-237-0016	
	Provisioning	NA	1-800-996-7053 (WestCon)
GSO	Maintenance	720-444-9990	720-444-9990

International customers

- International MNC customers contact the RCOE with any problems.
- All other international customers contact their Channel Partner with any problems.

Serviceability

Circuit-pack firmware changes and modified system software improve the ATM Port Network Connectivity (ATM-PNC) application on the TN2305B and TN2306B ATM interface circuit packs.

The Serviceability reports include

- Congestion and Cell-Loss Priority (CLP) bit monitoring
  - reports the status of the AAL-5 SVCs, the links across an ATM network
  - generates ATM-NTWK alarms and reports data to the Hardware Error Log.
- SONET-/SDH-layered alarms reported with the detection and clearing time prioritized (reported hierarchically):
  - Loss of Signal (LOS)
  - Loss of Pointer (LOP)
  - Alarm Indication Signal (MS-AIS and HP-AIS)
  - Remote Defect Identifier (MS-RDI and HP-RDI)
  - Loss of Frame (LOF)
  - HP-PSL
- Cell over/underruns and lost cells
  - are based on your traffic rate.
  - apply to the bearer channels (SVCs in ATM-PNC, PVCs in ATM-CES).
  - generate ATM-NTWK warning alarms (viewed with the **display errors** command).
- Internal performance report
  - shows queue overruns and buffer exhaustion problems.
  - generates no alarms but logs ATM-EI and ATM-TRK errors in the Hardware Error Log.
  - indicates whether the system is properly engineered.
- Automatic circuit pack reset after 30 minutes when
  - it is not an archangel.
  - it is not scanned by an archangel.
- Control link report (**status sys-link**)
  - requires craft (and higher) command permissions.
  - shows originating and terminating VPI.VCI links through an EPN.
  - shows the time that the link came up or went down.

- System up time report (**status atm board**)
  - — requires craft (and higher) command permissions.
  - — shows the elapsed time since the last circuit pack insertion and boot.
  - — compares the administered ATM address with the network address for mismatches.
  - — shows last time UNI and ILMI went up and down.
- VPI.VCI data appears on the **status station** screen for
  - — ATM-PNC configurations. The system parameters customer-options screen must have ATM-PNC enabled.
  - — the originating station.
  - — up to 10 connected ports.
  - — the active PNC only (duplicated systems).
- Enhancements to the **list trace station** or **list trace tac** (trunk access code) command show
  - — terminating VCI for setup connections between port networks.
  - — End System Identifier (ESI) portion of the ATM address for successful setups.
  - — a cause code for failed setups.
  - — 8 new messages to describe the setup status (setup, fail, rele, add, rej, drop, save, and reuse).

Serviceability information that follows makes it easier for you and field technicians to isolate and diagnose problems. Table 6-3 lists the diagnostic tool, the associated command, and when or how to use the information.

Table 6-3. ATM serviceability enhancements

Enhancement	Command	Use this to
Report congestion and CLP bit	None (ATM-NTWK warning alarms)	Assess the ATM network's performance.
Report SONET/SDH layer alarms	None	Isolate defects in the media transmission layer through alarm indication signals (AIS).
Report cell underruns and overruns	None (ATM-NTWK warning alarms)	Compare the ATM network's performance with the your required quality of service.
Report lost cells	None (ATM-NTWK warning alarms)	Assess the ATM network's performance.

Continued on next page

Table 6-3. ATM serviceability enhancements (Continued)

Enhancement	Command	Use this to
Report internal performance problems	**display errors** (ATM-EI and ATM-TRK errors, not reported as alarms)	Determine whether these conditions exist: ■ queue overruns ■ buffers or resources exhausted
Report control link details	**status sys-link**	Show status data for a specified system link.
Circuit pack automatically resets	None	Automatically reset an ATM circuit pack after 30 minutes in specific conditions.
Report system up time	**status atm board**	Determine when the circuit pack was last inserted or when a link went up or down.
Alarm reporting modified	None (ATM-EI and ATM-TRK alarms remapped as ATM-NTWK)	Assess the ATM network's performance.
Display VPI.VCI data	**status station**	Diagnose network problems without onsite personnel.
VPI.VCI assignments	**list trace**	Track successful and failed call setups.

Report congestion and CLP bit

Each ATM Interface tracks the number of received cells having the congestion indicator or the Cell-Loss Priority (CLP) bit set (marked). The total number of both types of cells either

- generates ATM-NTWK warning alarms when the number of marked cells received by the circuit pack (totaled across all SVCs) exceeds 100.
- retires ATM-NTWK warning alarms when the circuit pack receives less than 90 marked cells within the previous 15 minutes.

NOTE:
Only AAL-5 SVCs are monitored for CLP or congestion markings.

Report SONET/SDH layer alarms

SONET/SDH layer alarms are reported with priority (hierarchically). These include:

- Loss of Signal (LOS)
- Loss of Pointer (LOP)
- Alarm Indication Signal (MS-AIS and HP-AIS)
- Remote Defect Identifier (MS-RDI and HP-RDI)
- Loss of Frame (LOF)
- HP-PSL

The switch masks downstream defects within one transmission network layer. For example, if a defect is detected within the media transmission network layer, the downstream notification occurs through AIS in that layer and does not occur in a client layer also (for example, the path network layer).

Each reported alarm shows the time it was detected and the time it was cleared. Only the highest level alarm reports, as defined in the hierarchy (Table 6-4), where a

- + indicates that the defect contributes as an AND to the Boolean expression for the failure
- – indicates that the defect contributes as an AND NOT (NAND).
- no entry means that the defect is not considered when evaluating that failure.

Table 6-4. Synchronous Transmission Fault Condition: Contributing Synchronous Defects

	Defect							
	LOS	**LOF**	**MJS-AIS**	**MS-RDI**	**HP-AIS**	**LOP**	**HP-PSL**	**HP-RDI**
LOS	+							
LOF	–	+						
MJS-AIS	–	–	+					
MS-RDI	–	–	–	+				
HP-AIS	–	–	–		+			
LOP	–					+		
HP-PSL		–	–		–	–	+	
HP-RDI		–	–		–	–	–	+

Report cell underruns and overruns

The system monitors each bearer channel (SVCs in ATM-PNC, PVCs in ATM-CES) for cell underruns and overruns. These errors are aggregated and appear as ATM-NTWK warning alarms.

In general, SVCs are set up for a certain traffic rate. For example, constant bit rate (CBR) for voice is about 173 cells/second.

- If traffic is less than this rate, cell underruns are possible.
- If traffic is higher than this rate, cell overruns are possible.

If the network and traffic parameters are well-engineered/designed, you should not experience cell underruns or overruns. In case of either, use Table 6-5 to help troubleshoot the cause(s).

Table 6-5. Troubleshooting ATM cell underruns/overruns

Condition	Likely cause	Description	Action
Underrun	Network/switch jitter	In periods of high jitter, the network delays cell delivery.	Determine the cause of the network/switch jitter. You could have to contact your ATM service provider.
Overrun	Network/switch jitter resolved	When the jitter stops, delayed cells are delivered quickly.	Determine the cause of the network/switch jitter or the source of the extra network traffic.

Report lost cells

The system monitors each bearer channel (SVCs in ATM-PNC, PVCs in ATM-CES) for lost cells, which are totalled in 15-minute intervals and reported as ATM-NTWK warning alarms.

Report internal performance problems

The circuit pack reports internal performance problems including

- queue overruns
- exhausted buffers or other resources

Using an Error Type and Aux Data value to indicate the resource that experienced a performance problem, these ATM-EI (ATM-PNC applications) and ATM-TRK (ATM-CES applications) errors are reported in the Hardware Error Log but do not alarm. This helps service personnel or administrators understand when the Avaya DEFINITY Server has been engineered properly for the ATM Solution

To interpret the Error Type and Aux Data fields in the Hardware Error Log, look up the use of these maintenance objects:

- ATM-EI (Expansion Interface Circuit Pack)
- ATM-TRK (Circuit Emulation Service Circuit Pack)

Report control link details

The **status sys-link** command shows ATM-link data for each link that goes to an EPN and thereby traverses through an ATM switch, including the

- time that link last came up and last went down.
- originating and the terminating VPI.VCI data.

Screen 6-1 shows that the link encountered a fault and recovered by switching to a different inter-switch-node fiber.

```
status sys-link 2a0101                                  Page   1 of   2   SPE A

     Location: 02A0101        Type/Chan: EAL          Alarms: none
  Current Path: present           State: up          Time Up: 03/12/2001 10:48
  Faulted Path: present                           Last Fault: 03/12/2001 10:50

                              Faulted Hardware Path

             Maintenance                              Maintenance
  Location   Name       Alarms          Location     Name       Alarms

  01A1       PKT-INT    none
  PN 01      PKT-BUS    none
  01C01      ATM-EI     none
  0.32       VPI.VCI    none
  AT01A      ATM-NTWK   none
  AT02A      ATM-NTWK   none
  0.32       VPI.VCI    none
  AT02A      ATM-NTWK   none
```

Screen 6-1. Status sys-link screen, page 1

Both the originating and terminating VPI.VCI links are 0.32.

Scroll to the next page of the report, and you see the old VPI.VCI path for the faulted link (Screen 6-2).

```
status sys-link 2a0101                                  Page   2 of   2   SPE A

     Location: 02A0101        Type/Chan: EAL          Alarms: none
  Current Path: present           State: up          Time Up: 03/12/2001 10:48
  Faulted Path: present                           Last Fault: 03/12/2001 10:50

                              Faulted Hardware Path

             Maintenance                              Maintenance
  Location   Name       Alarms           Location    Name       Alarms

  01A1       PKT-INT    none
  PN 01      PKT-BUS    none
  01C01      ATM-EI     none
  0.35       VPI.VCI    none
  AT01A      ATM-NTWK   none
  AT02A      ATM-NTWK   none
  0.32       VPI.VCI    none
  AT02A      ATM-NTWK   none
```

Screen 6-2. Status sys-link screen, page 2

Use these information resources to interpret the **status sys-link** report:

- Screen 6-1 and Screen 6-2
- Figure 6-1

The ATM network encountered a fault at 10:48 and recovered 2 minutes later using a different VPI.VCI link (Figure 6-1).

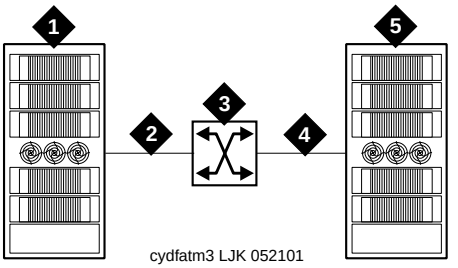

Figure Notes

1. DEFINITY Server PPN
2. VPI.VCI = 0.35
3. ATM network
4. VPI.VCI = 0.32
5. DEFINITY ECS EPN2

Figure 6-1. Troubleshooting schematic (status sys-link)

Additionally, use the following information when interpreting this report:

- If the VPI.VCI information is not available for an ATM segment of the link, n/a appears.
- If an SVC is down at the point that you enter the **status sys-link** command, the VPI.VCI data indicates when the SVC was up.
- A "-d" (down) follows the VPI.VCI value (for example, `0.1234-d`).

Circuit pack automatically resets

The circuit pack automatically resets after 30 minutes if

- it is not an archangel.
- it is not scanned by an archangel.

Report system up time

By using the **status atm board** command technicians can get a report listing the time elapsed since the

- circuit pack was last inserted.
- UNI link and ILMI link last went up and down.
- value of the sysUpTime variable for both the circuit pack and the corresponding network end of the ILMI link.

Screen 6-3 shows the command output.

```
status atm board 02A01                      Page 1 of 1     SPE A

    Location: 02A01    Personality: ATM-EI


ATM Address: 12345678901234567890123456789012345678901 Mismatch: No
Last Board Insertion: mm/dd/yyyy hh:mm
Board sysUpTime: 1234567890    Network sysUpTime: 1234567890
UNI   State: up Last Down: mm/dd/yyyy hh:mm Last Up: mm/dd/yyyy hh:mm
ILMI  State: up Last Down: mm/dd/yyyy hh:mm Last Up: mm/dd/yyyy hh:mm
```

Screen 6-3. Status atm board screen

NOTE:
Only circuit packs administered as ATM-EI or ATM-TRK personalities appear the `Location`, `Last Board Insertion` date and time, and `Board sysUpTime` fields. All other fields are turned off.

Alarm reporting modified

The ATM-related maintenance objects report conditions

- on the ATM circuit pack
- in the ATM network

and do not always reflect hardware conditions within your DEFINITY Server switch. In order to fairly assess the ATM network's performance, we recommend that you examine the

- Hardware Error Log (display errors) for ATM-NTWK errors, indicating ATM network faults (See the ATM-NTWK (ATM Network) maintenance object.)

  and the

- Red LED on the TN2305A/B or TN2306A/B circuit pack's faceplate, visually indicating network faults.

Table 6-6 shows the Cause Code (Error Types) that are now reported against the ATM-NTWK maintenance object:

Table 6-6. A few samples of the network errors reported by ATM-NTWK

Cause Code/ Error Type	Aux Data	Description
769		AAL5 or LAPD excessive
770		ATM UCH
771		VPI.VCI unknown
1281	16	Loss of Signal (LOS)
1281	17	Loss of Frame (LOF)
1281	18	Alarm Indication Signal (MS-AIS)
1281	19	Remote Defect Identifier (MS-RDI)
1281	20	Loss of Pointer (LOP)
1281	21	HP-PSL
1281	22	Alarm Indication Signal (HP-AIS)

NOTE:
These alarms still contribute to the parameters that determine PNC interchanges. For a complete list of possible network errors reported by ATM-NTWK, see the applicable maintenance documentation for your switch.

Display VPI.VCI data

For ATM-PNC configurations, an additional page to the **status station** screen appears and contains information about

- the VPI.VCI for the originating station.
- up to 10 connected port(s).
- the VPI.VCI associated with the connected port(s).

Use this command to get a snapshot of the VPI.VCI data for a specific station. These data enable you to diagnose their network(s) without onsite service personnel or Avaya technical support.

Command interactions

Also consider the following interactions when issuing or interpreting the **status station** command.

- For connected ports that are located in the same port network as the originating station, the VPI.VCI value of n/a appears.
- If VPI.VCI value has -d (down) added at the end (for example, 0.1234-d), this means that the SVC is down.

- This page appears only if ATM-PNC is enabled on the **system parameters customer-options** screen.
- For PNC Duplication, only the active VPI.VCI is shown.
- VPI.VCI data are not shown for:
  - **status trunk**
  - **status access-endpoint**
  - **status attendant**
  - **status bri-port**
  - **status data-module**

VPI.VCI assignments

The **list trace** command includes the terminating VCI number for setup connections between port networks. The command syntax for the qualifiers to this command are:

- **list trace station *xxxxx*/a** where ***xxxxx*** is the station number, and **/a** means that you are requesting ATM-specific data.
- **list trace tac *xxx*/a** where ***xxx*** is the trunk access code number, and **/a** means that you are requesting ATM-specific data.

Example

Screen 6-4 shows VPI.VCI data for a successful 2-party call setup.

```
list trace station 52501/a                    Page 1 of 1   SPE B

                              LIST TRACE


   time         data

15:12:07      Calling party station    57405 cid 0x20
15:12:09      dial 52501
15:12:09      ring station 52501 cid 0x20
15:12:09      ATM setup PN01-0081 to PN03-0045
15:12:09      ATM setup PN03-0046 to PN01-0082
15:12:11      active station 52501 cid 0x20
15:12:22      idle station 57405 cid 0x20
```

Screen 6-4. List trace screen (list trace station)

- If the setup is successful, the assigned VPI.VCI appears along with the Port Network (PN) number portion of the ATM address.
- If the setup fails, the cause code associated with the failure appears.

These events are not included in the **list trace** command:

- Parties dropped from the SVC by the network after a successful add party are neither detected nor reported.
- SVCs released or saved in the cache after the phone call is terminated are not traced. This applies to SVCs in existence when a call is hung up, and to SVCs that belonged to a discarded call when it is merged into another call.
- Events on SVCs not actually assigned to the call. This primarily includes SVCs supporting announcements, music and automatic wake-up. These SVCs are considered system resources and do not belong to any one call.
- Many events are not traced unless new firmware exists on both the originating and terminating ATM-EI boards. Some events only require new firmware on the originating or terminating board.
- Only events on the active PNC are reported. Events on the standby PNC, if any, are ignored.

Alarms and errors

Depending on the ATM-PNC or ATM-CES application and the DEFINITY Server you have, Table 6-7 describes the ATM maintenance objects and the platforms on which you can expect alarms and errors to occur. For specific maintenance information refer to one of the following books:

- *Maintenance for Avaya MultiVantage™ and DEFINITY® Server R*
- *Maintenance for Avaya MultiVantage™ and DEFINITY® Server SI*
- *Maintenance for Avaya MultiVantage™ and DEFINITY® Server CSI*

Table 6-7. ATM maintenance objects descriptions

Maintenance object	Description	PNC	CES	Avaya DEFINITY Server R	Avaya DEFINITY Server SI	Avaya DEFINITY Server CSI
ATM-BCH	Monitors the bearer channels containing digitized voice and data		X	X	X	X
ATM-DCH	Monitors the signaling channel containing control messages		X	X	X	X
ATM-EI	ATM Expansion Interface provides port network connectivity between the PPN and the EPN(s).	X		X		

Continued on next page

Table 6-7. ATM maintenance objects descriptions (Continued)

Maintenance object	Description	PNC	CES	Avaya DEFINITY Server R	Avaya DEFINITY Server SI	Avaya DEFINITY Server CSI
ATM-INTF	ATM Interface provides basic maintenance (test and reset) for ATM circuit packs that have not been administered as ATM Expansion Interface (ATM-EI) or ATM trunk (ATM-TRK).	X	X	X	X	X
ATM-NTWK	Indicates problems with the network, primarily signaling, including the ATM switch(es).	X		X		
ATM-SGRP	Monitors ATM signaling groups.		X	X	X	X
ATM-SYNC	Monitors the common reference frequency among the DEFINITY ECS, the ATM switch(es), central offices (CO), and customer premise equipment (CPE)	X		X		
ATM-TRK	Monitors the ATM circuit pack when administered for trunking.		X	X	X	X
EXP-PN	Is responsible for overall maintenance of an EPN	X		X		
SYS-LINK	Monitors system links		X	X	X	X

Troubleshooting ATM-CES

Table 6-8 provides a first-level method for troubleshooting an installation.

Table 6-8. ATM-CES installation troubleshooting checklist

Problem	Solution
Is the DEFINITY Server software Release 7 or later?	Verify that software is Release 7 or later
On System Parameters Maintenance screen Is `Bus Bridge` field set to **enabled**? (csi) Is `Packet Bus` field set to **activated**? (r,si) Are EI circuit packs TN570Bs or later?	Set to correct field Set to correct field Verify/replace EI circuit packs
All COR, COS, UDP, FRLs, AAR, and ARS support proper routing	Verify they are all set correctly

The following list provides tips for further ATM-CES troubleshooting:

- Inspecting LEDs—Describes the possible LED states on the
  - TN2305X/TN206X ATM interface circuit packs
  - ATM switch
- Troubleshooting interoperability—Provides guidelines for troubleshooting
  - Physical connections
  - Administration
  - TN2305X/TN206X circuit pack
  - ATM signaling architecture
- Unusual ATM trouble conditions—Describes difficult-to-diagnose failure modes in the DEFINITY ECS and ATM switch combinations.
- DEFINITY Server ATM-CES troubleshooting commands—Describes specific troubleshooting commands.

Inspecting LEDs

To get a high-level status of the system, observe the LEDs on the TN2305X/TN206X ATM interface circuit packs and the ATM switch. For information on interpreting the LEDs on the ATM switch, refer to your switch's quick reference guide. For information on interpreting the LEDs on the TN2305X/TN206X circuit packs, refer to the following books:

- *Maintenance for Avaya MultiVantage & DEFINITY Server R*
- *Maintenance for Avaya MultiVantage & DEFINITY Server SI*
- *Maintenance for Avaya MultiVantage & DEFINITY Server CSI .*

Troubleshooting interoperability

This section covers the following ATM interoperability topics:

- Physical connections—Checks for correct ATM installation and configuration
- Administration—Checks for correct DEFINITY ECS and ATM switch administration
- TN2305X/TN206X circuit pack—Checks LED status, circuit pack insertion, and demand tests
- ATM signaling architecture—Checks the interoperability between the DEFINITY ECS switch and the ATM switch

Because Avaya offers a variety of ATM switches, this discussion suggests general rather than specific diagnostics.

Physical connections

Has the ATM switch been installed and configured correctly?

Diagnostics

- Is the ATM switch powered up?
- If you are administering the ATM switch through a locally attached console, is there a local console terminal connected to the console port on the ATM switch processor circuit pack with the correctly pinned RS232 serial cable?
- If you are administering the ATM switch through telnet over the Ethernet, is there an Ethernet drop plugged into the Ethernet port on the ATM switch processor board? (Note that a few ATM switch commands may only be permitted over the local console terminal.)
- Has the ATM switch been booted using either a reset button or by turning the power off then on again?
- Did the ATM switch go through a normal power up sequence, including testing all of the LEDs?

- Are any ATM switch FAULT LEDs lit?
- Are the remaining ATM switch LEDs in a normal state?
- Can you log into the ATM switch console using the diagnostic account from the local console terminal or through telnet? If so, check the system status

    a. If the customer is providing an Ethernet connection to the ATM switch, does the `Ethernet IP address` field have the customer-provided Internet address?

    NOTE:
    You might not be able to administer the ATM switch through a telnet connection over the Ethernet, but if you are able to, make sure the Ethernet address is correct.

    b. If the customer is providing an Ethernet connection to the ATM switch, does the `Ethernet IP mask` field have the customer-provided mask (typically something like `255.255.255.0`, although other values are valid)?

    c. If the customer is providing an Ethernet connection to the ATM switch, does the `IP default router` field have the customer-provided Internet address?

    d. If the customer is providing an Ethernet connection to the ATM switch and intends to upload to or download from a TFTP server, does the `TFTP server` field have the customer-provided Internet address?

    e. Does the `ATM address` field have the correct network prefix (the first 13 bytes)?

    f. On th ATM switch, is the PVC administered correctly?

Administration

Is DEFINITY Server ATM-CES administered correctly?

D-channel problems. If the D-channel does not come up following CES administration, use the following steps to troubleshoot the cause.

Table 6-9. Troubleshooting CES

√	Step	Action	Description
	1.	Verify PVC is correctly administered	Check VPI/VCI (**change signaling-group *siggrpnbr***, screen 2)
	2.	Check channel number	Check that both ends of the emulated circuit have the same number of channels (**change signaling-group *siggrpnbr***, screen 2).
	3.	Check trunks	Both ends of the emulated circuit have the same number of trunks (**change trunk-group *trkgrpnbr***, screen 6). **NOTE:** A trunk group can contain either ISDN or ATM trunks but not both.
	4.	Check channels	Both ends of the emulated circuit use the same channel numbers (**change signaling-group *siggrpnbr***, screen 2). Use the same channel numbers for the port to channel mapping (page 2) for the other end. See ''Changing the port-to-channel mapping'' on page 5-22 for more information.
	5.	Check maximum number of emulated circuits	The maximum number of emulated circuits (signaling groups) on a single ATM circuit pack is 8. ■ Each circuit pack can have more than one signaling group and more than one D-channel ■ The D-channel from one emulated circuit cannot signal for the bearer channels of another emulated circuit (no Nonfacility Associated Signaling for virtual circuits).
	6.	Check minimum ports for emulated circuit	A minimum of 7 ports must be administered for each emulated circuit as follows: ■ at least 6 bearer (B) channels ■ one signaling (D) channel (required)

Continued on next page

Table 6-9. Troubleshooting CES (Continued)

√	Step	Action	Description
	7.	Check D-channel administration	The D-channel is administered in a port numbered 009–032 (**display signaling-group *siggrpnbr***, screen 2). **NOTE:** The D-channel is automatically populated in channel 24 (T1) and channel 16 (E1) and this must match on both ends.
	8.	Check trunk limits	DEFINITY Server switch trunk limits must not be exceeded (see Table 6-10)

Table 6-10. DEFINITY Server trunk capacities by model

Capacity	c, csi, si	r
Maximum trunks per trunk group	99	255
Maximum number of trunk groups	99	666
Maximum number of trunks in the system	400	4000

NOTE:
Port numbers on each end of the emulated circuit do not have to match.

Is the ATM switch administered correctly?

To verify that a specific Avaya ATM switch was administered correctly, refer to the appropriate reference guide.

TN2305X/TN206X circuit pack

Did the TN2305X/TN206X come up correctly?

1. Review the LED conditions for the TN2305X/TN206X (refer to the appropriate maintenance book for LED indications):
   - Do the TN2305X/TN206X LEDs indicate a normal operational state (any of the following):
     - Active in the PPN
     - Standby in the PPN
     - Archangel mode in the EPN
     - Standby in the EPN
     - CES in any PN
2. If after circuit pack insertion or a demand reset:
   - Do the TN2305X/TN206X LEDs indicate that it is booting?
   - Do the TN2305X/TN206X LEDs indicate it is downloading its DSPs?
   - Do the TN2305X/TN206X LEDs indicate that circuit pack is not completely inserted?
   - Do the TN2305X/TN206X LEDs indicate a maintenance alarm?
3. If the TN2305X/TN206X is inserted and shows a vintage number, type **test board *UUCSS*** and press Enter; Screen 6-5 displays.

```
test board 1b11                                                    Page   1

                                TEST RESULTS

Port       Maintenance Name  Alt. Name Test No. Result          Error Code

01B11       ATM-TRK                    598      PASS
01B11       ATM-TRK                    1293     PASS               888
01B11       ATM-TRK                    1259     PASS
01B11009    ATM-BCH           001/006   255      PASS
01B11009    ATM-BCH           001/006   256      PASS
01B11009    ATM-BCH           001/006   257      PASS
01B11010    ATM-BCH           001/001   255      PASS
01B11010    ATM-BCH           001/001   257      PASS
01B11011    ATM-BCH           001/002   255      PASS
01B11011    ATM-BCH           001/002   256      PASS
01B11011    ATM-BCH           001/002   257      PASS
01B11012    ATM-BCH           001/003   255      PASS
01B11012    ATM-BCH           001/003   256      PASS
01B11012    ATM-BCH           001/003   257      PASS
01B11013    ATM-BCH           001/004   255      PASS
01B11013    ATM-BCH           001/004   256      PASS
01B11013    ATM-BCH           001/004   257      PASS
01B11014    ATM-BCH           001/005   255      PASS
01B11014    ATM-BCH           001/005   256      PASS
01B11014    ATM-BCH           001/005   257      PASS
01B11200    ATM-BCH           001/007   255      PASS
01B11200    ATM-BCH           001/007   256      PASS
01B11200    ATM-BCH           001/007   257      PASS
01B11015    ATM-DCH                     643      PASS
1           ATM-SGRP                    636      PASS
1           ATM-SGRP                    1291
1           ATM-SGRP                    647
```

Screen 6-5. Screen output for test board *number*

- The `Result` field should show PASS for each test number. If any of the tests fail, refer to the ATM-TRK maintenance object in one of the following books:
  - — *Maintenance for Avaya MultiVantage & DEFINITY Server R*
  - — *Maintenance for Avaya MultiVantage & DEFINITY Server SI*
  - — *Maintenance for Avaya MultiVantage & DEFINITY Server CSi*

Possible causes

1. The TN2305X/TN206X circuit pack is in a slot different from the DEFINITY administration.
2. The TN2305X/TN206X was not completely inserted.

ATM signaling architecture

Troubleshooting interoperability between the DEFINITY Server switch and the ATM switch involves understanding the architecture of ATM signaling (Figure 6-2). An Avaya Cajun A500 network switch is used to show this concept.

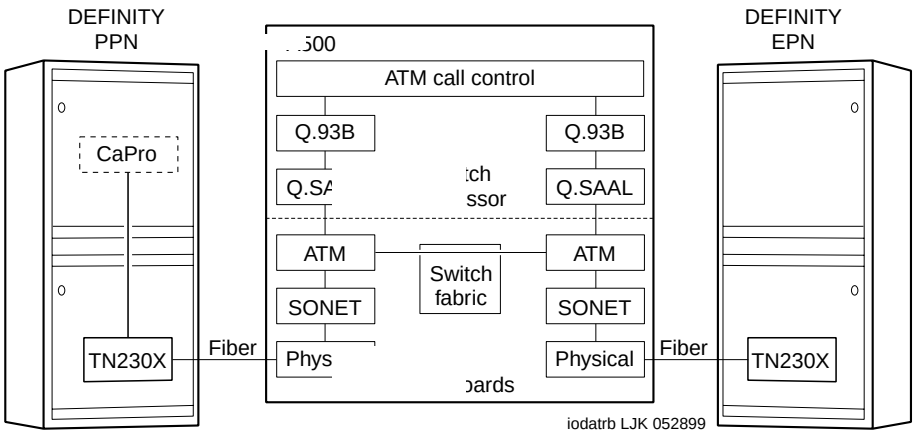

Figure 6-2. ATM signaling architecture

The following list shows the ATM-stack layers discussed in this section:

- Physical layer
- SONET/SDH layer
- Call processing (CaPro) Layer

Physical layer

Is there an optical signal between the TN2305X/TN206X and the ATM switch?

1. Identify the OC-3/STM-1 ports on the ATM switch that have DEFINITY port networks attached.
   - Be aware that customers may use other ports on the ATM switch for applications unrelated to their DEFINITY servers (LAN traffic or multimedia applications, for examples).
   - These other applications may manifest themselves in the output of the troubleshooting commands you run on the ATM switch. Avaya DEFINITY Server port networks must be identified by their ATM switch port numbers.

     NOTE:
     The following examples show DEFINITY Server port networks connected to ATM switch ports A1.1 and A1.2.

2. Does the TN2305X/TN206X's YELLOW LED flash 100 ms on and 100 ms off, indicating a loss of signal on the fiber? Recall that the TN2305X/TN206X detects continuity problems with either the transmit (bottom) or the receive (top) fibers.

   If the fiber shows a loss of signal, refer to the "Fiber Fault Isolation Procedure" in *Maintenance for Avaya MultiVantage & DEFINITY Server R*.
3. Is the ATM switch port's LED indicating a loss of signal on the fiber? Note that the ATM switch may detect continuity problems only with the receive fiber; the state of the transmit fiber might not be detected.
4. Refer to your ATM switch's quick reference guide for troubleshooting commands.

Possible causes.

Check the following list for possible causes.

- The fiber is disconnected from the ATM switch and/or the TN2305X/TN206X circuit pack.
- The transmit and receive fibers are swapped at the ATM switch or the TN2305X/TN206X circuit pack (but not both).

- There is a break in the fiber.
    - The TN2305X/TN206X is not transmitting a carrier (not inserted, not powered, or not administered). See the ATM-TRK maintenance object in one of the following books:
        - — *Maintenance for Avaya MultiVantage & DEFINITY Server R*
        - — *Maintenance for Avaya MultiVantage & DEFINITY Server SI*
        - — *Maintenance for Avaya MultiVantage & DEFINITY Server CSI*
- Hardware safety interlocks on optical transceivers may cut transmitter power if no carrier is received, so lack of a receive carrier could indicate a transmitter problem at the same end.
- The ATM switch does not recognize that a port circuit pack is in the slot. You may need to re-administer the ATM switch port boards. Refer to your ATM switch's quick reference guide for further information.

Recommended Action.

1. Plug in, swap, repair, or replace the fiber as necessary.
2. Verify that the port circuit pack is completely inserted.

SONET/SDH layer

Are SONET/SDH frames reaching the ATM switch?

Is the ATM switch port's LED indicating no cell traffic?

- Check the transmit and receive cell count fields. Each field's values should be increasing if the TN2305X/TN206X is actively sending and receiving cells to and from the ATM switch.
- Check for SONET/SDH layer alarms, LOP, LOF, LOS, and so on.
- If neither field is increasing, the ATM switch port may be down. Verify that the admin status is up.
- If the receive cell count is increasing but the transmit cell count is not increasing, this may be because the port was administered with no UNI signaling. Ensure that signaling is UNI3.1.
- Although the error counters may not be zero, they should not be large either compared with the receive and transmit cell counters. If the counters are large and increasing, check the fiber integrity. Make sure the fiber pairs are securely plugged into both the TN2305X/TN206X circuit pack and the ATM switch.
- If the fiber has been pulled and reinserted as part of fault diagnosis, the nonzero loss of signal error counter may be correct.

Call processing (CaPro) Layer

Are control channels being established from the PPN to the EPN?

Diagnostics.

- Do you get a dial tone on a set on the port network in question?
- Can you ring a set on the EPN dialing from the PPN and vice-versa?

1. Type **list sys-link** and press Enter. Screen 6-6 shows the screen output.

```
list sys-link

                          SYSTEM LINKS INFORMATION

Location  Link Type/    State   Current      Faulted    Last Fault
          Channel               Path         Path       Recorded

02A0101   EAL           up      present      present    12/06/1997 16:20
01B0202   PACL          up      present      present    12/06/1997 16:17
02A0102   PACL          up      present      present    12/06/1997 16:20
```

Screen 6-6. System links information

Ensure that the fields have the values indicated below.

`Link Type/ Channel`	One PACL to each TN2305X/TN206X in either a PPN or an EPN, and one EAL to each TN2305X/TN206X in an EPN.
`State`	`up`

2. On the ATM switch console, look at the switch circuit.

   The VBRnrt (Variable Bit Rate) virtual circuits between the ATM switch PPN and EPN ports are used for signaling between the PPN and each EPN.

- These are established once when initialized under control of Avaya Call Processing software on a DEFINITY Server. They represent the ATM Control Link (ACL) and Expansion Archangel Link (EAL).
- VBRnrt virtual circuits are also used for ISDN channels between DEFINITY port networks.
- Other VBRnrt virtual circuits may exist between ATM switch ports that are not associated with DEFINITY Server port networks. A common use of VBRnrt circuits is multimedia and video-conferencing systems.

Are talk paths being established between port networks?

Diagnostics.

- Can you talk both ways on a set on one port network dialed from another port network and vice versa?
  - — The CBR (Constant Bit Rate) virtual circuits (VCs) between ATM switch PPN port and ATM switch EPN port are used for talk paths between port networks (PPN to EPN, EPN to PPN, or EPN to EPN).
  - — They are established when calls are first setup between port networks. Each virtual circuit represents one party of a complete multiparty talk path.
  - — These virtual circuits may persist beyond the duration of a phone call. The Avaya Call Processing software saves virtual circuits for a few seconds after the end stations have hung up in case the VC can be used again for another call between the same two port networks.
  - — There may be other CBR virtual circuits between ATM switch ports that are not associated with DEFINITY port networks. A common CBR application is Circuit Emulation, in which T-1, T-3, and so forth circuits are carried over ATM.

Unusual ATM trouble conditions

A few failure modes in the DEFINITY Server/ATM switch combinations are particularly difficult to diagnose. One example might be that you cannot make a completely successful call even though most indications from DEFINITY Server and the ATM switch look good.

This section documents some hints and clues that may help diagnose the following failure modes:

- Incorrectly typed or omitted EPN route or end system identifier (ATM switch)
- Swapped routes, end system identifiers, or fiber between a PPN and an EPN

Incorrectly typed or omitted EPN route or end system identifier (ATM switch)

Symptoms

Talk paths are one-way, from the PPN to the EPN: you can hear tones from the PPN end station to the EPN end station but not vice versa. Because the signaling channels are bidirectional virtual circuits (VCs) established from the PPN to the EPN, these can be routed correctly and come up just fine. Talk paths are two unidirectional virtual circuits, so a single call has one VC from the PPN to the EPN (which is routed correctly) and one VC from the EPN to the PPN (which cannot be routed).

Diagnostics

1. At the ATM switch, check the ATM addresses.
2. Look for a cause code 3 (`No route to destination`).

Action

1. Correct the ATM address translations in the ATM switch.

Swapped routes, end system identifiers, or fiber between a PPN and an EPN

Symptoms

- An incorrectly connected EPN TN2305X/TN206X circuit pack is not completely inserted.
- Dial tone is present on end stations on the PPN and on correctly connected EPNs, but no dial tone is present on the affected EPN end stations.
- Calls cannot be made between the PPN and the correctly connected EPNs because talk paths cannot be routed correctly.

Diagnostics

1. Check to see if the ATM switch shows VBR control channels from the ATM switch port intended for the incorrectly connected EPN (but actually connected logically or physically to the PPN) that should not exist.

Action

1. Correct the ATM addresses (or swap fibers) on the ATM switch between the incorrectly connected PPN and EPN.

DEFINITY Server ATM-CES troubleshooting commands

If ATM-CES is enabled (**change system-parameters customer-options**), 2 commands become available:

- **change/display signaling-group *siggrpnbr*** lets you determine the number of channels and lets you know their slot location.
- **change trunk-group *trkgrpnbr*** lets you determine the number of trunks.

Troubleshooting ATM-PNC

This section describes the process for troubleshooting the DEFINITY Server ATM-PNC interface with the ATM switch.

- Inspecting LEDs—Describes the possible LED states on the
  - TN2305X/TN206X ATM interface circuit packs
  - ATM switch
- Troubleshooting synchronization (400A only)—
  - Connected through an ICSU
  - Connected through a DSU/CSU
- Troubleshooting interoperability—Provides guidelines for troubleshooting
  - Physical connections
  - Administration
  - TN2305X/TN206X circuit pack
  - ATM signaling architecture
- Unusual ATM trouble conditions—Describes difficult-to-diagnose failure modes in the DEFINITY Server and ATM switch combinations.
- DEFINITY Server ATM-PNC troubleshooting commands—Describes the following specific troubleshooting commands:
  - change/display atm pnc-pairs
  - list measurements atm pnc-latency

Inspecting LEDs

To get a high-level status of the system, observe the LEDs on the TN2305X/TN206X ATM interface circuit packs and the ATM switch. For information on interpreting the LEDs on the ATM switch, refer to your switch's quick reference guide. For information on interpreting the LEDs on the TN2305X/TN206X circuit packs, refer to the following book:

- *Maintenance for Avaya MultiVantage™ and DEFINITY ® Server R.*

Troubleshooting synchronization (400A only)

Connected through an ICSU

To troubleshoot 400A synchronization problems in systems where the synchronization signal connects through an ICSU, follow the procedures in Table 6-11.

Table 6-11. Troubleshooting 400A synchronization (through an ICSU)

√	Step	Action	Description
	1.	Check all connections	If the LEDs on the DS1 circuit pack indicate an error condition, or any of the tests associated with testing the DS1 circuit pack fails, recheck all cables, connectors, and the splitter connection to the back of the DS1 circuit pack.
	2.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***). If the tests pass, go to step 14 (release). If a test fails, continue with step 3.
	3.	Reseat circuit pack	Reseat the DS1 circuit pack.
	4.	Retest the circuit pack	Repeat the test (**test board *UUCSS***). If Tests 138 through 145 pass, go to step 14 (release). If any test fails, go to step 5.
	5.	Busyout the DS1 circuit pack	To suppress alarms on the DS1 circuit pack, type **busyout board *UUCSS*** and press Enter.
	6.	Remove ICSU	Remove the ICSU module from the splitter.
	7.	Remove splitter	Remove the splitter from the DS1 circuit pack.
	8.	Put ICSU directly on DS1 circuit pack	Reconnect the ICSU module directly to the back of the DS1 circuit pack (without the splitter) and reseat the DS1 circuit pack. After approximately 30 seconds the DS1 Status LEDs should extinguish, leaving only the green Status 3 LED on steady.

Continued on next page

Table 6-11. Troubleshooting 400A synchronization (through an ICSU) (Continued)

√	Step	Action	Description
	9.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***) and verify that the DS1 circuit pack passes Tests 138 through 145. If any one of Test 138 through 145 fails, follow the repair procedures listed in *DEFINITY ECS Maintenance for R10r*.
	10.	Replace splitter	If the tests pass, replace the splitter onto the back of the DS1 circuit pack.
	11.	Reseat the circuit pack	Reseat the DS1 circuit pack and check the Amphenol connectors, making sure they are seated properly.
	12.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***) and verify that the DS1 circuit pack passes Tests 138 through 145. If any one of Test 138 through 145 fails, follow the repair procedures listed in *DEFINITY ECS Maintenance for R10r* or replace the splitter.
	13.	Escalate if necessary	If the ICSU tests OK, go to step 14. If step 12 still fails, escalate to Tier 3 or replace the splitter.
	14.	Release the circuit pack	Release the DS1 circuit pack (**release board *UUCSS***).
	15.	Verify active synchronization source	Verify that the designated DS1 circuit pack is now the *active* sync source (**status synchronization**).

Connected through a DSU/CSU

To troubleshoot synchronization problems in systems where the synchronization signal connects through a Data Service Unit (DSU) or Channel Service Unit (CSU), follow the procedures in Table 6-12.

Use this table if the

- DTE or RLB loopback tests fail
- CSU or DSU/CSU does not return to normal service

Table 6-12. Troubleshooting 400A T1 synchronization (through a DSU/CSU)

√	Step	Action	Description
	1.	If DSU/CSU does not go back to normal operation	Verify that the current line compensation settings on the DS1 circuit pack (**change board**) match the DTE equalization settings of the CSU or DSU/CSU for the length of cable:
	2.	Go through readout steps	On the 316X CSU or DSU/CSU, press the double-up arrow.
	3.	Continue	Press the button under the “Config” readout
	4.	Continue	Press the button under the “Activ.” readout
	5.	Continue	Press the button under the “Edit.” readout
	6.	Continue	Press the button under the “DTE.” readout
	7.	Continue	Press the button under the “Next” readout until “Equalization” displays. The top line of the display shows the current settings.
	8.	Verify settings	If these settings do not agree with the DS1 administration (step 1), enter the correct settings and retest. If the test still fails, continue.
	9.	Increase equalization settings	Increase the equalization settings on the CSU or DSU/CSU by one value.
	10.	Go through readout steps	Press the right-arrow button until “Value” displays. For example, if 0 through 133 displays, go to 133 through 266, and so on.
	11.	Continue	Press the double-up arrow.
	12.	Continue	Press the button under the “Yes” readout when asked to save options.
	13.	Continue	Press the button under the “Active” readout when asked where to save the options. “Command Complete” displays.
	14.	Retest	Retest
	15.	If the 316X CSU or DSU/CSU fails the DTE or RLB loopback tests	Remove the H600-307 DS1 cable from the splitter and the splitter from the DS1 circuit pack
	16.	Remove splitter	Remove the splitter from the DS1 circuit pack

Continued on next page

Table 6-12. Troubleshooting 400A T1 synchronization (through a DSU/CSU) (Continued)

√	Step	Action	Description
	17.	Reconnect the cable	Reconnect the H600-307 cable directly to the DS1 circuit pack After about 30 s, all the alarm LEDs on the 316X DSU/CSU should go out. If the alarm LEDs on the 316X CSU or DSU/CSU do not go out, go to step 19.
	18.	Test circuit pack	Test the DS1 circuit pack (**test board *UUCSS***). If any one of Test 138 through 145 fails, follow the repair procedures listed in *DEFINITY ECS Maintenance for R10r*.
	19.	Check for errors	Wait 15 minutes and check that the **list measurements ds1 summary *UUCSS*** report is free of any errors. Use Table 3-6 to help interpret the report.
	20.	Replace the splitter	If the alarm LEDs on the 316X are not lit, replace the splitter. If the splitter has already been replaced, escalate to Tier 3.
	21.	Test the DS1 circuit pack	If the alarm LEDs on the 316X extinguish with the new splitter installed, perform a **test board UUCSS** and press Enter and verify that the DS1 circuit pack passes tests 138 through 145. If any one of Test 138 through 145 fails, follow the repair procedures listed in *DEFINITY ECS Maintenance for R10r*.
	22.	Check error report	Wait 15 minutes and perform a **list measurements ds1 summary UUCSS** and verify that the DS1 circuit pack is free of errors. Use Table 3-6 to help interpret the report.
	23.	Release circuit pack	If there are no errors in step 22, release the DS1 circuit pack (**release board UUCSS**).
	24.	If the alarm LEDs on the 316X fail to go out	Reseat the DS1 circuit pack.
	25.	Escalate if necessary	If step 24 still fails, escalate to Tier 3

Troubleshooting synchronization (401A/402A/403A)

To troubleshoot 401A/402A/403A synchronization problems, follow the procedures in Table 6-13.

Table 6-13. Troubleshooting 401A/402A/403A synchronization

√	Step	Action	Description
	1.	Check all connections	If the LEDs on the DS1 circuit pack indicate an error condition, or any of the tests associated with testing the DS1 circuit pack fails, recheck all cables, connectors, and the splitter connection to the back of the DS1 circuit pack.
	2.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***). If the tests pass, go to step 13 (release). If a test fails, continue with step 3.
	3.	Reseat circuit pack	Reseat the DS1 circuit pack.
	4.	Retest the circuit pack	Repeat the test (**test board *UUCSS***). If Tests 138 through 145 pass, go to step 13 (release). If any test fails, go to step 5.
	5.	Busyout the DS1 circuit pack	To suppress alarms on the DS1 circuit pack, type **busyout board *UUCSS*** and press Enter.
	6.	Remove splitter	Remove the splitter from the DS1 circuit pack.
	7.	Connect cable directly on DS1 circuit pack	Reconnect the cable directly to the back of the DS1 circuit pack (without the splitter) and reseat the DS1 circuit pack. After approximately 30 seconds the DS1 Status LEDs should extinguish, leaving only the green Status 3 LED on steady.
	8.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***) and verify that the DS1 circuit pack passes Tests 138 through 145. If any one of Test 138 through 145 fails, follow the repair procedures listed in *DEFINITY ECS Maintenance for R10r*.
	9.	Replace splitter	If the tests pass, replace the splitter onto the back of the DS1 circuit pack.
	10.	Reseat the circuit pack	Reseat the DS1 circuit pack and check the Amphenol connectors, making sure they are seated properly.
	11.	Test the circuit pack	Test the circuit pack (**test board *UUCSS***) and verify that the DS1 circuit pack passes Tests 138 through 145. If any one of Test 138 through 145 fails, follow the repair procedures listed in *Maintenance for Avaya MultiVantage and DEFINITY Server R*, or replace the splitter.

Continued on next page

Table 6-13. Troubleshooting 401A/402A/403A synchronization (Continued)

√	Step	Action	Description
	12.	Escalate if necessary	If the DS1 circuit pack tests OK, go to step 13. If step 11 still fails, escalate to Tier 3 or replace the splitter.
	13.	Release the circuit pack	Release the DS1 circuit pack (**release board *UUCSS***).
	14.	Verify active synchronization source	Verify that the designated DS1 circuit pack is now the *active* sync source (**status synchronization**).

Troubleshooting interoperability

This section covers the following ATM interoperability topics:

- Physical connections—Checks for correct ATM installation and configuration
- Administration—Checks for correct DEFINITY ECS and ATM switch administration
- TN2305X/TN206X circuit pack—Checks LED status, circuit pack insertion, and demand tests
- ATM signaling architecture—Checks the interoperability between the DEFINITY ECS switch and the ATM switch

Because Avaya offers a variety of ATM switches, this discussion suggests general rather than specific diagnostics.

Physical connections

Has the ATM switch been installed and configured correctly?

Diagnostics

- Is the ATM switch powered up?
- If you are administering the ATM switch through a locally attached console, is there a local console terminal connected to the console port on the ATM switch processor circuit pack with the correctly pinned RS232 serial cable?
- If you are administering the ATM switch through telnet over the Ethernet, is there an Ethernet drop plugged into the Ethernet port on the ATM switch processor board? (Note that a few ATM switch commands are only permitted over the local console terminal.)
- Has the ATM switch been booted using either a reset button or by turning the power off then on again?
- Did the ATM switch go through a normal power up sequence, including testing all of the LEDs?
- Are any ATM switch FAULT LEDs lit?
- Are the remaining ATM switch LEDs in a normal state?
- Can you log into the ATM switch console using the diagnostic account from the local console terminal or through telnet? If so, check the system status

    a. If the customer is providing an Ethernet connection to the ATM switch, does the `Ethernet IP address` field have the customer-provided Internet address?

    NOTE:
    You might not be able to administer the ATM switch through a telnet connection over the Ethernet, but if you are able to, make sure the Ethernet address is correct.

    b. If the customer is providing an Ethernet connection to the ATM switch, does the `Ethernet IP mask` field have the customer-provided mask (typically something like `255.255.255.0`, although other values are valid)?

    c. If the customer is providing an Ethernet connection to the ATM switch, does the `IP default router` field have the customer-provided Internet address?

    d. If the customer is providing an Ethernet connection to the ATM switch and intends to upload to or download from a TFTP server, does the `TFTP server` field have the customer-provided Internet address?

    e. Does the `ATM address` field have the correct network prefix (the first 13 bytes)?

Administration

Administration must be correct for both the DEFINITY Server and ATM switches.

DEFINITY Server switch administration

ATM-PNC. Is DEFINITY Server ATM-PNC administered correctly?

1. Type **list atm pnc** and press Enter. The cabinet, carrier and slot positions of each administered TN2305X/TN206X circuit pack display is as shown in Screen 6-7. Ensure that each circuit pack's physical location matches the display.

```
list atm pnc                                                  Page   1   SPE A
                                ATM PNC
PNC                  A-PNC                    B-PNC
Connection #         LOC                      LOC

 1                   01B02
 2                   02A01
```

Screen 6-7. Screen output for list atm pnc command

Alternatively, type **list configuration *UUC*** and press Enter (noncontrol cabinets) to confirm the PPN and EPN circuit pack locations and correct insertion.

2. Type **status pnc** and press Enter. This display tells you which TN2305X/TN206X circuit pack is active in a duplicated system and how many alarms (if any) of each severity level have been logged for the circuit pack. Screen 6-8 shows the output from this command.

```
status pnc
                          PORT NETWORK CONNECTIVITY

                                Duplicated? no
                             Software Locked?
                              Standby Busied?

                             Standby Refreshed?
                          Interchange Disabled?

             A-PNC                                   B-PNC

             Mode: active                            Mode:
   State of Health: functional              State of Health:
    Inter PN Index: 00.00.00                 Inter PN Index:

      Major Alarms: 0                          Major Alarms:
      Minor Alarms: 0                          Minor Alarms:
    Warning Alarms: 0                        Warning Alarms:
```

Screen 6-8. Screen output for status pnc command

3. Type either **list configuration *UUC*** (for the carrier in which the ATM interface circuit packs reside) or **display circuit-packs *cabinet*** (noncontrol cabinet) and press Enter. This command tells you in more detail what boards are in which slots in each cabinet and carrier. Verify that the TN2305X/TN206Xs are physically located in the slots indicated on the display. Screen 6-9 on page 6-39 shows the output for the **display circuit-packs 1** command; Screen 6-10 on page 6-40 shows the output for the **display circuit-packs 2** command.

```
display circuit-packs 1

                              CIRCUIT PACKS

       Cabinet: 1                             Carrier: A
 Cabinet Layout: five-carrier            Carrier Type: processor

          *** PROCESSOR BOARDS NOT ADMINISTERABLE IN THIS SCREEN ***

                              CIRCUIT PACKS

       Cabinet: 1                             Carrier: B
 Cabinet Layout: five-carrier            Carrier Type: port

 Slot Code  Sfx  Name                    Slot Code  Sfx  Name
  00:                                     11: TN464  C   DS1 INTERFACE
  01:                                     12: TN464  F   DS1 INTERFACE
  02: TN2305     ATM PNC EI               13: TN767  F   DS1 INTERFACE
  03:                                     14: TN767  C   DS1 INTERFACE
  04: TN754  C   DIGITAL LINE             15: TN760  D   TIE TRUNK
  05: TN746  B   ANALOG LINE              16: TN760  D   TIE TRUNK
  06: TN753      DID TRUNK                17:
  07: TN771  D   MAINTENANCE/TEST         18:
  08: TN747  B   CO TRUNK                 19:
  09: TN556  B   BRI LINE                 20:
  10: TN767  C   DS1 INTERFACE

  '#' indicates circuit pack conflict.
```

Screen 6-9. Screen output for display circuit-packs 1

```
display circuit-packs 2
                              CIRCUIT PACKS

        Cabinet: 2                              Carrier: A
 Cabinet Layout: single-carrier-stack    Carrier Type: expansion-control

 Slot Code  Sfx  Name                    Slot Code  Sfx  Name
                                          11: TN746  B   ANALOG LINE
  01: TN2305     ATM PNC EI               12:
  02:                                     13:
  03:                                     14:
  04: TN2305     ATM TRUNK                15:
  05:                                     16:
  06:                                     17: TN754  C   DIGITAL LINE
  07:
  08:
  09: TN767  E   DS1 INTERFACE
  10: TN754  B   DIGITAL LINE

  '#' indicates circuit pack conflict.
```

Screen 6-10. Screen output for circuit-packs 2

4. Type **display atm pnc *connection*** and press Enter.

   This display tells you the ATM addresses that have been administered for each TN2305X/TN206X. Verify that each ATM address (the concatenation of the 5 displayed hexadecimal fields) is correct and match those in the ATM switch. Screen 6-11 shows the output for the **display atm pnc 1** command; Screen 6-12 shows the output for the **display atm pnc 2** command.

```
display atm pnc 1
                                    ATM PNC

                              Connection Number: 1



      Location: 01B02
          Name:

Address Format: ICD ATM

           AFI: 47
           ICD: 0005
        HO-DSP: 80FFE1000000F2071B02
           ESI: 000000000000
           SEL: 00
```

Screen 6-11. Screen output for display atm pnc 1

```
display atm pnc 2
                                        ATM PNC

                                Connection Number: 2



      Location: 02A01
          Name:

Address Format: ICD ATM

           AFI: 47
           ICD: 0005
        HO-DSP: 80FFE1000000F2072A01
           ESI: 000000000000
           SEL: 00
```

Screen 6-12. Screen output for display atm pnc 2

Administered with end system identifiers

If the port networks are addressed using end system identifiers, the display looks like Screen 6-13 (pnc 1) and Screen 6-14 (pnc 2).

```
display atm pnc 1
                                        ATM PNC

                                Connection Number: 1

            A - PNC
      Location: 01B02
          Name:

Address Format: E.164 ATM Private

           AFI: 45
         E.164: 0001013035381053
        HO-DSP: 00000000
           ESI: 000000000011
           SEL: 00
```

Screen 6-13. Screen output for display atm pnc 1 with end system identifiers

```
display atm pnc 2
                                    ATM PNC

                               Connection Number: 2

            A - PNC

      Location: 02A01
          Name:

Address Format: E.164 ATM Private

           AFI: 45
         E.164: 0001013035381053
        HO-DSP: 00000000
           ESI: 000000000012
           SEL: 00
```

Screen 6-14. Screen output for display atm pnc 2 with end system identifiers

ATM signaling links

Figure 6-3 shows the signaling links in an ATM-PNC configuration.

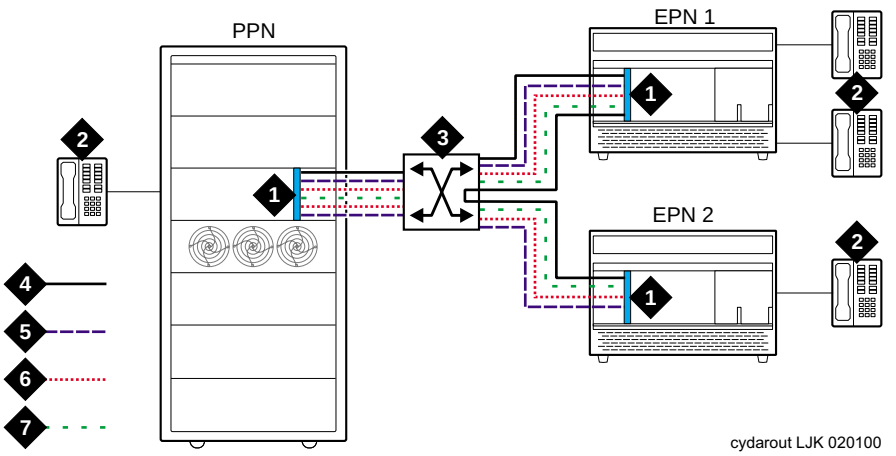

Figure Notes

1. DEFINITY Server switch PPN/EPN
2. Telephones
3. ATM switch
4. Constant bit rate switched virtual connection (CBR-SVC)
5. PNC ATM control link (PACL)
6. Expansion archangel link (EAL)
7. ATM signaling

Figure 6-3. ATM signaling links

Signaling sequences. Use the information in Table 6-14 to help determine trouble with ATM signaling. Abbreviations used in this table correspond to those in Figure 6-3 on page 6-43.

Table 6-14. ATM signaling sequences

	Signaling between the PPN and the EPN	Call between EPN2 and EPN 3
1.	TN2305X/TN206X circuit pack in the PPN establishes a variable bit-rate switched virtual connection (VBR-SVC) for DEFINITY ECS signaling through the ATM switch to each EPN.	Station goes off hook in EPN2. CCMS messages sent over the already established EAL to call processing in the PPN.
2.	TN2305X/TN206X circuit pack in the PPN establishes EAL and PACL links with each EPN within the above VBR-SVC.	Call Processing sends a message over the PACL to the TN2305X/TN206X circuit pack in EPN2 to establish a connection to the TN2305X/TN206X circuit pack in EPN3.
3.	Links come up	TN2305X/TN206X circuit pack in EPN2 sends an ATM signaling message to the ATM switch to establish a CBR-SVC link to the TN2305X/TN206X circuit pack in EPN3.
4.		Call processing in the PPN sends CCMS messages to the station in EPN2 over the already-established EAL.
5.		Repeat steps 2 through 4 for the EPN3 to EPN2 connection.

ATM switch administration

Is the ATM switch administered correctly?

To verify that a specific Avaya ATM switch was administered correctly, refer to the appropriate reference guide for the network switch.

TN2305X/TN206X circuit pack

Did the TN2305X/TN206X come up correctly?

1. Review the LED conditions for the TN2305X/TN206X (refer to the maintenance book for LED indications):
   - Do the TN2305X/TN206X LEDs indicate a normal operational state (any of the following):
     - — Active in the PPN
     - — Standby in the PPN
     - — Archangel mode in the EPN
     - — Standby in the EPN
2. If after circuit pack insertion or a demand reset:
   - Do the TN2305X/TN206X LEDs indicate that it is booting?
   - Do the TN2305X/TN206X LEDs indicate it is downloading its DSPs?
   - Do the TN2305X/TN206X LEDs indicate that circuit pack is not completely inserted?
   - Do the TN2305X/TN206X LEDs indicate a maintenance alarm?
3. Type **list configuration carrier *UUCC*** and press Enter. See Screen 6-15 (1b) and Screen 6-16 (2a).

```
list configuration carrier 1b

                              SYSTEM CONFIGURATION

Board                                                        Assigned Ports
Number    Board Type              Code     Vintage    u=unassigned t=tti p=psa

01B02    ATM PNC EI               TN2305  HW02 FW007
01B04    DIGITAL LINE             TN754C  000002     u  u  u  u  u  u  u  u
01B05    ANALOG LINE              TN746B  000010     u  u  u  u  u  06 u  u
                                                     u  u  u  u  u  u  u  u
01B06    DID TRUNK                TN753   000021     u  u  u  u  u  u  u  u
01B07    MAINTENANCE/TEST         TN771D  000006     u  02 03 04
01B08    CO TRUNK                 TN747B  000018     u  u  u  u  u  u  u  u
01B09    BRI LINE                 TN556B  000003     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
01B10    DS1 INTERFACE            TN767C  000003     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
```

Screen 6-15. List configuration carrier 1b screen

```
list configuration carrier 2a

                              SYSTEM CONFIGURATION

Board                                                        Assigned Ports
Number   Board Type              Code     Vintage    u=unassigned t=tti p=psa

02A01    ATM PNC EI               TN2305  HW02 FW007
02A09    DS1 INTERFACE            TN767E  000004     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
02A10    DIGITAL LINE             TN754B  000016     u  u  u  u  u  u  u  u
02A11    ANALOG LINE              TN746B  000010     01 u  u  u  u  u  u  u
                                                     u  u  u  u  u  u  u  u
02A17    DIGITAL LINE             TN754C  000002     u  u  u  u  u  u  u  u
```

Screen 6-16. List configuration carrier 2a screen

- Make sure the TN2305X/TN206X circuit pack is shown in the correct slot (check the `Board Number` field).
- Fields should have values as indicated below:

Field	Value
`Board Type`	`ATM PNC EI`
`Vintage`	The TN2305X/TN206X vintage is split between the hardware and firmware vintages. the hardware vintage matches the label on the latch, and the firmware number indicates the firmware vintage. If `Vintage` is `no board`, then either the circuit pack is in the incorrect slot or the circuit pack was not completely inserted. Reinsert circuit pack into correct slot.

4. If the TN2305X/TN206X is inserted and shows a vintage number, type **test board *UUCSS*** and press Enter; Screen 6-17 displays.

```
test board 1b02

                                TEST RESULTS

  Port      Maintenance Name  Alt. Name Test No. Result           Error Code

  01B02     ATM-EI                      316      PASS
  01B02     ATM-EI                      598      PASS
  01B02     ATM-EI                      1293     PASS                 888
  01B02     ATM-EI                      241      PASS
  01B02     ATM-EI                      304      PASS
  01B02     ATM-EI                      1259     PASS
```

Screen 6-17. Screen output for test board *UUCSS*

- The `Result` field should show PASS for each test number. If any of the tests fail, refer to the ATM-EI maintenance objects in *Maintenance for Avaya MultiVantage and DEFINITY Server R*.

Possible causes

1. The TN2305X/TN206X circuit pack is in a slot different from the DEFINITY administration.
2. The TN2305X/TN206X was not completely inserted.

ATM signaling architecture

Troubleshooting interoperability between the DEFINITY Server switch and the ATM switch involves understanding the architecture of ATM signaling (Figure 6-4). An Avaya Cajun A500 switch is used to show this concept.

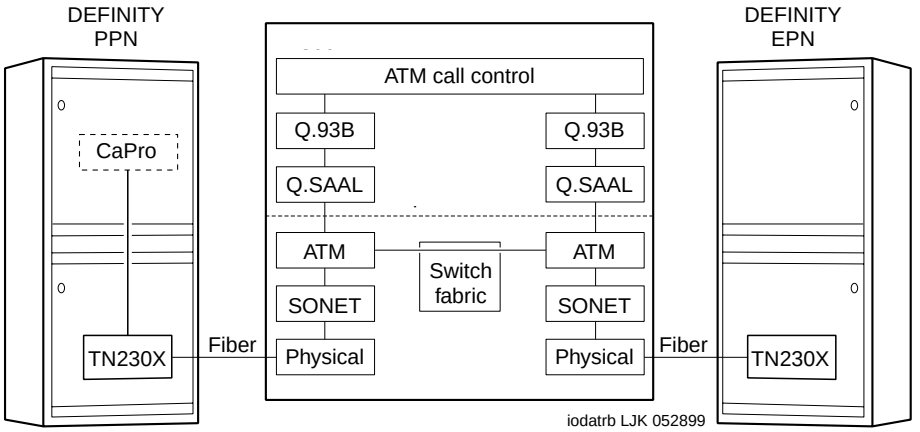

Figure 6-4. ATM signaling architecture

The following list shows the ATM-stack layers discussed in this section:

- Physical layer
- SONET/SDH layer
- Q.SAAL (data link) layer
- ATM call control
- Call processing (CaPro) Layer

Physical layer

Is there an optical signal between the TN2305X/TN206X and the ATM switch?

1. Identify the OC-3/STM-1 ports on the ATM switch that have DEFINITY port networks attached.
   - Be aware that customers may use other ports on the ATM switch for applications unrelated to DEFINITY (LAN traffic or multimedia applications, for examples).
   - These other applications may manifest themselves in the output of the troubleshooting commands you run on the ATM switch. DEFINITY port networks must be identified by their ATM switch port numbers.

     NOTE:
     The following examples show DEFINITY port networks connected to ATM switch ports A1.1 and A1.2.

1. Does the TN2305X/TN206X's YELLOW LED flash 100 ms on and 100 ms off, indicating a loss of signal on the fiber? Recall that the TN2305X/TN206X detects continuity problems with either the transmit (bottom) or the receive (top) fibers.

   If the fiber shows a loss of signal, refer to the "Fiber Fault Isolation Procedure" in *Maintenance for Avaya MultiVantage & DEFINITY Server R*.
2. Is the ATM switch port's LED indicating a loss of signal on the fiber? Note that the ATM switch may detect continuity problems only with the receive fiber; the state of the transmit fiber might not be detected.
3. Refer to your ATM switch's quick reference guide for troubleshooting commands.

Possible causes.

Check the following list for possible causes.

- The fiber is disconnected from the ATM switch and/or the TN2305X/TN206X circuit pack.
- The transmit and receive fibers are swapped at the ATM switch or the TN2305X/TN206X circuit pack (but not both).
- There is a break in the fiber.
- The TN2305X/TN206X is not transmitting a carrier (not inserted, not powered, or not administered). See the ATM-EI or ATM-TRK maintenance objects in *Maintenance for Avaya MultiVantage & DEFINITY Server R*.

- Hardware safety interlocks on optical transceivers may cut transmitter power if no carrier is received, so lack of a receive carrier could indicate a transmitter problem at the same end.
- The ATM switch does not recognize that a port circuit pack is in the slot. You may need to re-administer the ATM switch port boards. Refer to your ATM switch's quick reference guide for further information.

Recommended Action.

1. Plug in, swap, repair, or replace the fiber as necessary.
2. Verify that the port circuit pack is completely inserted.

SONET/SDH layer

Are SONET/SDH frames reaching the ATM switch?

Is the ATM switch port's LED indicating no cell traffic?

- Check the transmit and receive cell count fields. Each field's values should be increasing if the TN2305X/TN206X is actively sending and receiving cells to and from the ATM switch.
- Check for SONET/SDH layer alarms, LOP, LUF, and so on.
- If neither field is increasing, the ATM switch port may be down. Verify that the admin status is up.
- If the receive cell count is increasing but the transmit cell count is not increasing, this may be because the port was administered with no UNI signaling. Ensure that signaling is UNI3.1.
- Although the error counters may not be zero, they should not be large either compared with the receive and transmit cell counters. If the counters are large and increasing, check the fiber integrity. Make sure the fiber pairs are securely plugged into both the TN2305X/TN206X circuit pack and the ATM switch.
- If the fiber has been pulled and reinserted as part of fault diagnosis, the nonzero loss of signal error counter may be correct.

Q.SAAL (data link) layer

Are ATM signaling messages reaching the ATM switch Call Control?

NOTE:
If the TN2305X/TN206X circuit pack is not connected to the ATM switch at the Q.SAAL protocol layer, then no report is displayed.

1. If the port of interest is not configured for UNI signaling, then the port was administered for no UNI signaling. Verify that signaling is UNI3.1.
2. If the port of interest was administered for UNI3.0 signaling, verify that signaling is UNI3.1.
3. Check to see if the TN2305X/TN206X circuit pack is actively sending and receiving Q.SAAL Protocol Data Units with the ATM switch.

Q.93B (network) layer

Are connection requests being received by ATM switch call control?

NOTE:
If there is no connection between the TN2305X/TN206X circuit pack and the ATM switch at the Q.93B protocol layer, then no report displays.

1. Check the port of interest. If it is not configured for UNI signaling, then the port was administered for no UNI signaling. Verify that signaling is UNI3.1
2. The connect, setup, and release message counters should be a nonzero number if the ATM switch is handling Q.93B protocol layer messages sent by the PPN and EPN. They may not increase during troubleshooting unless calls are being made because the PPN initially sets up control connections to the PPN and then sets up talk path connections as needed.
3. Check to see if connections are being rejected. The error may be on the PPN port even though the EPN port is the one misbehaving and vice versa.
4. Type **display errors** and press Enter.
5. Set the `Error List` field to **errors** and `Category` field to **PNC** on the input screen (Screen 6-18) and press Enter to display any cause codes (see Table 6-15) returned from the ATM network to a TN2305X/TN206X circuit pack on the PPN (and to a TN2305X/TN206X circuit pack on an EPN). This is successful only if the links between the PPN and the EPN remain up so that the message from the EPN is logged.

   See the ATM-EI maintenance object in one of the following books:

   - *Maintenance for Avaya MultiVantage and DEFINITY Server R.*

```
display errors                                          Page   1 of   1   SPE A
                                  ERROR REPORT

      The following options control which errors will be displayed.
         ERROR TYPES

            Error Type:                  Error List: errors


         REPORT PERIOD

            Interval: a      From:   /  /  :   To:   /  /  :

         EQUIPMENT TYPE ( Choose only one, if any, of the following )

                              Cabinet:
                         Port Network:
                         Board Number:
                                 Port:
                             Category: pnc
                            Extension:
                  Trunk ( group/member ):    /
```

Screen 6-18. Error report

Screen 6-19 shows the screen output for the **display errors** command.

```
display errors                                                 Page   9   SPE A

                                HARDWARE ERROR REPORT

Port     Mtce     Alt     Err   Aux     First       Last      Err Err Rt/ Al Ac
         Name     Name     Type  Data    Occur       Occur     Cnt Rt  Hr  St

AT01A    ATM-NTWK         41    1     11/12/16:59 12/09/15:10 14  0   0   n  n
AT01A    ATM-NTWK         31    0     11/13/18:27 11/20/20:02 5   0   0   n  n
AT02A    ATM-NTWK         0     0     11/13/18:45 11/13/18:45 1   0   0   n  n
AT02A    ATM-NTWK         31    0     11/15/14:40 11/15/14:41 2   120 0   n  n
AT01B    ATM-NTWK         31    0     11/16/17:39 11/16/17:39 1   0   0   n  n
AT01A    ATM-NTWK         3     1     11/16/18:19 11/26/13:13 12  0   0   n  n
```

Screen 6-19. Hardware error report—screen 9

In this example the errors that have `ATM-NTWK` for `Name` field and `1` for `Aux Data` field indicate an error returned to the TN2305X/TN206X circuit pack from the ATM network. In this case, the `Err Type` field shows the cause code returned by the ATM network (see Table 6-15 on page 6-52). In the earlier example, two cause codes (41 and 3) are reported from the ATM network. For more information about these cause codes and repair information see the ATM-NTWK (ATM Network Error) maintenance object.

Table 6-15. Observed Cause Codes

Cause Code	Definition	Observed Cause
3	No route to destination	The ATM addresses administered in the ATM switch or in DEFINITY (**display atm pnc**) are incorrect.
31	Normal, unspecified	This is a normal return.
41	Temporary failure	This “try again later” cause code has been observed when the source of the problem is on another port (for example, a routing problem on another port that displays cause code 3).
47	Resources unavailable, unspecified	DEFINITY call volume is too high for the available resources in the ATM network.
63	Service or option unavailable, unspecified	DEFINITY call volume is too high for the available resources in the ATM network.

ATM call control

Are ATM signaling connections being setup to ATM switch Call Control?

The UBR virtual circuits between the ATM switch PPN port and ATM switch port and between the EPN port and ATM switch port are ATM signaling channels between the port network and the ATM switch. They are used to request connection setups and releases to other end points such as another port network. These are established by each TN2305X/TN206X when it comes up, independent of Avaya Call Processing on DEFINITY Servers.

Other UBR virtual circuits may exist between ATM switch ports that are not associated with DEFINITY port networks and may be signaling channels for other applications (for example, data network traffic).

Call processing (CaPro) Layer

Are control channels being established from the PPN to the EPN?

Diagnostics.

- Do you get a dial tone on a set on the port network in question?
- Can you ring a set on the EPN dialing from the PPN and vice-versa?

Are talk paths being established between port networks?

Diagnostics.

- Can you talk both ways on a set on one port network dialed from another port network and vice versa?
  - — The CBR (Constant Bit Rate) virtual circuits (VCs) between ATM switch PPN port and ATM switch EPN port are used for talk paths between port networks (PPN to EPN, EPN to PPN, or EPN to EPN).
  - — They are established when calls are first setup between port networks. Each virtual circuit represents one party of a complete multiparty talk path.
  - — These virtual circuits may persist beyond the duration of a phone call. The DEFINITY Call Processing software saves virtual circuits for a few seconds after the end stations have hung up in case the VC can be used again for another call between the same two port networks. Also, check 3-way conference calling across 3 port networks.
  - — There may be other CBR virtual circuits between ATM switch ports that are not associated with DEFINITY port networks. A common CBR application is Circuit Emulation, in which T-1, T-3, and so forth circuits are carried over ATM.

Unusual ATM trouble conditions

A few failure modes in the DEFINITY Server/ATM switch combinations are particularly difficult to diagnose. One example might be that you cannot make a completely successful call even though most indications from DEFINITY Server and the ATM switch look good.

This section documents some hints and clues that may help diagnose the following failure modes:

- Incorrectly typed or omitted EPN route or end system identifier (ATM switch)
- Swapped routes, end system identifiers, or fiber between a PPN and an EPN
- Swapped routes, end system identifiers, or fiber between A- and B-side TN2305X/TN206Xs on EPN
- Swapped routes, end system identifiers, or fiber between two EPNs

Incorrectly typed or omitted EPN route or end system identifier (ATM switch)

Symptoms

Talk paths are one-way, from the PPN to the EPN: you can hear tones from the PPN end station to the EPN end station but not vice versa. Because the signaling channels are bidirectional virtual circuits (VCs) established from the PPN to the EPN, these can be routed correctly and come up just fine. Talk paths are two unidirectional virtual circuits, so a single call has one VC from the PPN to the EPN (which is routed correctly) and one VC from the EPN to the PPN (which cannot be routed).

Diagnostics

1. At the ATM switch, check the ATM addresses.
2. Look for a cause code 3 (`No route to destination`).

Action

1. Correct the ATM address translations in the ATM switch.

Swapped routes, end system identifiers, or fiber between a PPN and an EPN

Symptoms

- An incorrectly connected EPN TN2305X/TN206X circuit pack is not completely inserted.
- Dial tone is present on end stations on the PPN and on correctly connected EPNs, but no dial tone is present on the affected EPN end stations.
- Calls cannot be made between the PPN and the correctly connected EPNs because talk paths cannot be routed correctly.

Diagnostics

1. Check to see if the ATM switch shows VBR control channels from the ATM switch port intended for the incorrectly connected EPN (but actually connected logically or physically to the PPN) that should not exist.

Action

1. Correct the ATM addresses (or swap fibers) on the ATM switch between the incorrectly connected PPN and EPN.

Swapped routes, end system identifiers, or fiber between two EPNs

Symptoms

- All TN2305X/TN206X circuit packs are completely inserted.
- The PPN cold starts both incorrectly connected EPNs as usual.
- Both EPNs log many `WRONG BOARD INSERTED` errors (**list configuration all** or **display circuit-packs *carrier***), providing the EPNs actually do have different circuit packs configured in the same slots.
- Some end stations may work if they are connected to the correct circuit pack in the same slot on both EPNs. Otherwise, end stations on the PPN have dial tone, while end stations on the EPNs do not.
- All ATM switch diagnostic commands look good.

Diagnostics

1. Check log for `WRONG BOARD INSERTED` errors (**list configuration all** or **display circuit-packs *carrier***).

Action

1. Correct the ATM addresses (or swap fibers) on the ATM switch between the incorrectly connected EPNs.

Swapped routes, end system identifiers, or fiber between A- and B-side TN2305X/TN206Xs on EPN

Symptoms

- The PPN establishes links to what it thinks is the active TN2305X/TN206X circuit pack on the EPN.
- As normal, it reboots this TN2305X/TN206X circuit pack, and when complete, it resets the EPN. When this happens, the active (instead of the standby) TN2305X/TN206X circuit pack reboots, dropping the links.
- To recover, the PPN re-establishes links to what it thinks is the active TN2305X/TN206X circuit pack and the cycle repeats indefinitely.

Diagnostics

1. Type **status pnc** and press Enter. The screen shows both the A-side and B-side `State of Health` field as `partially functional`.

Action

1. Correct the ATM addresses (or swap fibers) on the ATM switch between the A and B side of the EPN.

DEFINITY Server ATM-PNC troubleshooting commands

Wide-area networks (WAN), especially those constructed as an internet using public network facilities, may take inter-PN connectivity to the edge of acceptable performance. The switch may experience delays, blockages, or connection losses because of circumstances beyond the control of switch management. Variations in performance may be expected during periods of high traffic.

If ATM-PNC is enabled, 2 commands are available:

- **change/display atm pnc-pairs** lets you get inter-port-network measurements for up to 10 ordered pairs of port networks
- **list measurements atm pnc-latency** reports data about ATM cell latency and connection times.

In both of these commands, you must supply the following information:

- the number of connections requested,
- the average connection setup time in milliseconds,
- the number of ATM network setup requests required, and
- the average setup time for the ATM connections.

Separate sets of measurements are available for the A and B sides in critical reliability systems.

change/display atm pnc-pairs

This command lets you select 10 pairs of port networks for which measurements can be reported. Screen 6-20 shows the output for the command.

```
change atm pnc-pairs

                        PNC MEASUREMENTS PAIRS

Pair  Orig  Dest

      PN    PN
1     1     5
2     1     8
3     5     8
4     5     7
5     4     2
6     10    11
7     10    12
8     10    1
9     1     10
```

Screen 6-20. PNC measurements pairs screen (change/display atm pnc-pairs)

Field descriptions

`Pair`	Identifies the port network pair number (read only).
`Orig PN` `Dest PN`	These entries identify the originating port network and the destination port network for the measured SVCs (values are between 1 and 44; default is `blank`).

list measurements atm pnc-latency

This command reads and displays the collected information regarding ATM cell latency and connection times. The command-line syntax is:

- **list measurements atm pnc-latency** [***last-hour, today-peak, yesterday-peak***] [***print* | *schedule***]

NOTE:
If a PN pair is changed during a 24-hour period, the peak value reported for the (new) pair is the highest latency measured after the change. If you type **list measurements atm pnc-latency** and press Enter while the PNC duplication feature is *disabled*, the output contains data for A-PNC *only*.

Measurements are displayed only for administered pnc-pairs. That is, if 5 pairs were administered on the ATM PNC Measurements Pairs screen, the **list measurements atm pnc-latency** output consists of 5 measurement entries. If the system time has been modified through the **set time** command during any measurement hour Y, that measurement hour is displayed as Y** instead of Y00, to indicate that the data for that hour may be invalid.

If an administered pnc-pair is changed, the next time measurements are gathered, the ***today-peak*** entry for the old pnc-pair is replaced with an entry for the new pair, and all counters are set to 0.

Screen 6-21 shows the output for this command.

```
list measurements atm pnc-latency last-hour

Switch Name: _______________    Date: 7:23 pm  SAT MAR 21, 1998

                          ATM PNC LATENCY MEASUREMENTS

           -----------A-PNC-----------           ---------B-PNC----------
Orig Dest PN Connection  ATM NW Setup  Hour    PN Connection  ATM NW Setup  Hour
PN   PN   Count     ms    Count   ms           Count     ms   Count    ms
1    5    2200     143    2055    153  1900
1    8    1219     78     1144    83   1900
5    8    2663     220    2386    245  1900
5    7    143      105    123     122  1900
4    2    7101     326    6845    338  1900
10   11   353      54     343     56   1900
10   12   3360     76     3326    77   1900
10   1    1570     71     1547    72   1900
1    10   1570     83     1547    84   1900
8    2    1100     62     1038    66   1900
```

Screen 6-21. ATM-PNC latency measurements

Field descriptions

`Orig PN/Dest PN`	Identifies the originating port network and the destination port network for the measured SVCs (default is blank).
`PN Count`	The number of setup attempts on the port network
`Connection ms`	The amount of time (in milliseconds) for the connection
`ATM NW Count`	The number of setup attempts on the ATM network
`Setup ms`	The amount of time (in milliseconds) to set up the connection.
`Hour`	The time of the data collection.

Conserving ATM bandwidth

Port Networks in a DEFINITY ATM-PNC configuration, when used with the Avaya access concentrators or other ATM switches interfacing to bandwidth-constricted or congested facilities, can incur contention for bandwidth, resulting in failed call completions. Figure 6-5 represents a DEFINITY ATM-PNC configuration in which Inverse Multiplexing for ATM (IMA) is used going into and coming out of the network cloud.

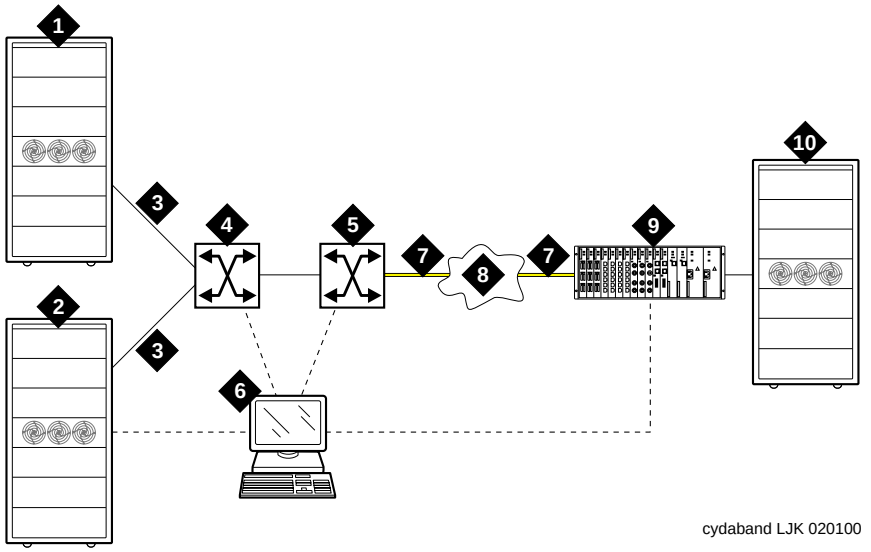

Figure Notes

1. DEFINITY Server PPN
2. DEFINITY Server Expansion Port Network (EPN)
3. OC-3/STM-1 connection
4. ATM switch A
5. ATM switch B
6. DEFINITY Server access terminal
7. IMA connection
8. ATM network
9. Access concentrator
10. DEFINITY Server EPN

Figure 6-5. Bandwidth-constricted ATM network configuration

In this configuration connections from the DEFINITY Server switch and the ATM backbone switch and to the ATM access concentrator are OC-3/STM-1 through the TN2305X/TN206X ATM interface circuit packs over fiber optic cable. When traffic exceeds the capacities of the IMA links, contention for access to the ATM network occurs. In such cases, SVC setups requested by the DEFINITY Server can be denied by the ATM network and associated components, and calls are not completed.

In this section, a failed SVC setup means that the ATM network has actively rejected the request. A delayed SVC setup means that the SVC setup exceeded a time threshold, specified in milliseconds (ms).

Performance indicators of both failed and delayed SVC setups:

- The called party may hear ringing, take the receiver off-hook, and hear nothing. The called party may eventually receive a delayed call, but never receives a failed call.
- If the call was delayed, the calling party hears silence if one of the SVCs is not up or hears the called party if it is up.
- If the call is never completed, the caller eventually hangs up without knowing why the call was not completed.

Therefore, SVC failures that occur more often than normal are most often evidence of an ATM network that is out of specification.

The tools to manage the DEFINITY Server switch and the ATM network are:

- Alarming out-of-spec conditions
- SVC latency commands
- Administration thresholds to either allow or deny completion of calls that require a new SVC over a path that recently experienced a high number of delayed or failed SVCs.

Alarming out-of-spec conditions

Out-of-spec conditions in the ATM network are reported against the ATM-NTWK maintenance object in the Alarm Report and the Hardware Error Report (**display errors**). Refer to one of the following books for an example of a Hardware Error Report with an ATM-NTWK alarm:

- *Maintenance for Avaya MultiVantage and DEFINITY Server R*
- *Maintenance for Avaya MultiVantage and DEFINITY Server SI*
- *Maintenance for Avaya MultiVantage and DEFINITY Server CSI.*

SVC latency commands

Two reports are available to help monitor the ATM network:

1. The ATM PNC Latency Histogram report (accessed through the **list measurements atm latency-histogram** command) shows:
   - Setup count
   - AddParty count
   - total
   - average latencies
   - histogram (21 different time bins ranging from 0-9 msec. to +10 sec.)

   Syntax: **list measurements atm latency-histogram *current-hour*** | ***last-hour*** | ***today-total*** | ***yesterday-total*** [***print*** or ***schedule***]

The **list measurements atm latency-histogram** output is shown in Screen 6-22.

```
list measurements atm latency-histogram last-hour

                                                        Page 1      SPE A
Switch Name:                                Date: 10:27 am TUE OCT 25, 1999
                          ATM PNC LATENCY HISTOGRAM

   Setup Count:  770      Average Latency (msec): 53        Failure Count: 3
AddParty Count:  538      Average Latency (msec): 92        Failure Count: 1
   Total Count: 1308      Average Latency (msec): 71        Failure Count: 4

    Range (msec) Setup AddParty Total   Range (sec) Setup AddParty Total
    0-9             0       0     0     1-1.9           1       0     1
    10-19         200       2   202     2-2.9           0       0     0
    20-49         400       3   403     3-3.9           0       0     0
    50-99         100       1   101     4-4.9           6       1     7
   100-149         50       6    56     5-5.9           0       0     0
   150-199         10       0    10     6-6.9           0       0     0
   200-249          3       0     3     7-7.9           0       0     0
   250-299          0       0     0     8-8.9           0       0     0
   300-399          0       0     0     9-9.9           0       0     0
   400-499          0       0     0      10 +           0       0     0
   500-999          0       0     0
```

Screen 6-22. ATM-PNC latency histogram report

Field descriptions:

`Setup Count:`	The number of SVCs setup during the time period indicated. Values: 0 - 9999999
`AddParty Count:`	The number of ADDPARTY requests processed. Values: 0 - 9999999
`Total Count:`	The total number of SETUP and ADDPARTY requests. Values: 0 - 9999999
`Average Latency:`	Average latency in milliseconds for SVC type described during the time period indicated. Values: 0 - 8000
`Failure Count:`	The number of SVCs of the type described that could not be established by the ATM network during the time period. This does not include delayed SVCs; that is, the delay exceeded the threshold set for `Timeout (msec):` on the ATM-Related System Parameters form. Values: 0 - 9999. The number "9999" displays if the value is greater than 9999.
`(msec) Count:`	The number of delayed SVCs that fell within the time range (milliseconds) during the time period indicated. Values: 0 - 9999999
`(sec) Count:`	The number of delayed SVCs that fell within the time range (seconds) during the time period indicated. Values: 0 - 9999999

2. The ATM PNC Delayed/Failed Setups report (accessed through the **list measurements atm setup-events**) shows:
   - event date
   - event time
   - event type (delayed or failed)
   - delay time (in ms)
   - from/to PN connection numbers
   - PNC connection (A-PNC or B-PNC)

Syntax: **list measurements atm setup-events** [***x***] or [***from-conn x***] [***to-conn x***] [***print*** or ***schedule***]

The command syntax allows you to list setup events for a particular connection number or for a range of connection numbers (Table 6-16).

Table 6-16. Constricted bandwidth administration procedure

Command	Description
list measurements atm setup-events	Lists up to 100 of the most recent setup events
list measurements atm setup-events from-conn 3	Lists all setup events from connection 3 to all other connections
list measurements atm setup-events from-conn 3 to-conn 4	Lists all setup events from connection 3 to connection 4
list measurements atm setup-events to-conn 4	Lists all setup events from all connections to connection 4
list measurements atm setup-events 4	Lists all setup events from or to connection 4

The report from the **list measurement atm setup-events** command looks like Screen 6-23

```
list measurements atm setup-events
                                                        Page 1

Switch Name:        Date: 2:33 pm  TUE DEC 12, 1999

                     ATM PNC DELAYED/FAILED SETUPS

Date       Time      Event    Delay(msec)    From Conn To Conn  PNC

12/12/1999 14:32:10  delayed  1765              3        7     A-PNC
12/12/1999 14:31:37  failed                     3        7     A-PNC
12/12/1999 14:31:22  delayed  1809              7        8     A-PNC
12/12/1999 14:31:18  delayed  1672             12        6     B-PNC
12/12/1999 14:31:15  delayed  1023              3        7     B-PNC
12/12/1999 14:29:45  delayed  1005              1        3     B-PNC
12/12/1999 14:29:23  failed                     3        1     A-PNC
12/12/1999 14:28:12  failed                     6        2     A-PNC
12/12/1999 14:27:56  delayed  2088              6        7     A-PNC
12/12/1999 14:27:24  delayed  1308              6        8     B-PNC
12/12/1999 14:27:05  delayed  1011              6        2     A-PNC
12/12/1999 14:26:38  failed                    11        4     B-PNC
12/12/1999 14:26:32  delayed  1246              3        7     A-PNC
```

Screen 6-23. ATM-PNC delayed/failed setups report

Field descriptions:

`Switch Name:`	The value administered on the system-parameters features form.
`Date`	Time and date that the command was executed.
`Date`	System date when the event occurred (4-character).
`Time:`	System time when the event occurred
`Event:`	The type of event (delayed or failed)
`Delay (msec):`	The delay value is only displayed for delayed events. For failed events, this field is blank. Values range from 250 to 20,000
`From Conn:`	The originating connection number
`To Conn:`	The destination connection number
`PNC:`	A-PNC or B-PNC

Administration

Use the procedure in Table 6-17 to administer ATM Constricted Bandwidth.

Table 6-17. Constricted bandwidth administration procedure

√	Step	Action	Description
	1.	Turn feature on	Turn the feature on by changing the `Async. Transfer Mode (ATM)?` field on the customer options form (**change system-parameters customer-options**) to **y** (Screen 6-24). This requires a Avaya Services login.
	2.	Set thresholds	Set the impairment thresholds in 4 fields on the ATM-Related System Parameters form (**change system-parameters atm**) shown in Screen 6-25: ■ `Activation (%)` ■ `Deactivation (%)` ■ `Timeout (msec)` ■ `Deny Calls Using Impaired Paths?` Press Enter to effect the changes.

Continued on next page

Table 6-17. Constricted bandwidth administration procedure (Continued)

√	Step	Action	Description
	3.	Set alarm options	Alarms generated due to impaired paths are reported against the ATM-NTWK maintenance object. The default alarm level is WARNING, but may be administered as either MINOR or WARNING. ■ Use the **set options** and press Enter to change the `Off-board ATM Network Alarms` field on the Alarm Reporting Options form (Screen 6-26 on page 6-67).

Constricted bandwidth administration screens

```
change system-parameters customer-options                      Page   2 of   6
                              OPTIONAL FEATURES

    Abbreviated Dialing Enhanced List? y                      CAS Branch? y
        Access Security Gateway (ASG)? y                        CAS Main? y
        Analog Trunk Incoming Call ID? y                 Change COR by FAC? n
 A/D Grp/Sys List Dialing Start at 01? y  Cvg Of Calls Redirected Off-net? y
Answer Supervision by Call Classifier? y                       DCS (Basic)? y
                                ARS? y                 DCS Call Coverage? y
               ARS/AAR Partitioning? y               DCS with Rerouting? y
            ARS/AAR Shortcut Dialing? n            DEFINITY Network Admin? y
                                             Digital Loss Plan Modification? n
      ASAI Proprietary Adjunct Links? y                        DS1 MSP? y
      Async. Transfer Mode (ATM) PNC? y     Emergency Access to Attendant? y
  Async. Transfer Mode (ATM) Trunking? y           Extended Cvg/Fwd Admin? y
                                ATMS? y       External Device Alarm Admin? y
                Attendant Vectoring? n                  Flexible Billing? y
             Audible Message Waiting? y     Forced Entry of Account Codes? y
                 Authorization Codes? y        Global Call Classification? y


        (NOTE: You must logoff & login to effect the permission changes.)
```

Screen 6-24. Optional features—screen 2

```
change system-parameters atm                                          Page 1

                    ATM-RELATED SYSTEM PARAMETERS

THRESHOLDS OF SETUP EVENTS TO DECLARE IMPAIRMENT

                                      Activation (%):  4
                                    Deactivation (%):  3
                                      Timeout (msec):  1000

TREATMENT DURING IMPAIRED CONDITIONS

                         Deny Calls Using Impaired Paths?  n
```

Screen 6-25. ATM-related system parameters

Field descriptions:

Activation (%)	This field specifies the percentage of setup events for a path to become impaired. That is, if the percentage of setup events for a given path meets or exceeds this administered value, then it becomes impaired (see example below). An alarm is raised against an ATM-IMP when one or more paths originating from that ATM-IMP become impaired. [Values 1 to 20, default is 4]
Deactivation (%)	This field specifies the percentage of setup events for a path to come out of the impaired state. That is, if the percentage of setup events for an impaired path meets or drops below this administered value, then it is no longer impaired (see example below). An alarm is retired when no more impaired paths are originating from that ATM-IMP. [Values 0 to19, default is 3]
Timeout (msec)	The maximum number of milliseconds allowed for an SVC connection to be completed before being counted as delayed. [Values 250 to 20,000, default is 1000]
Deny Calls Using Impaired Paths?	This field specifies whether to deny calls that use connections over impaired paths. If the option is **y**, then calls that require a new SVC on an impaired path on the active PNC are not completed. If the option is **n**, then those calls are treated according to current administered parameters for ATM PNC. [Default is n]

Example:

If the value for Activation (%) is 5, then the value for Deactivation (%) can be 0, 1, 2, 3, or 4.

```
set options                                                  Page 1 of   2
                        ALARM REPORTING OPTIONS

                                                 Major Minor

                          On-board Station Alarms: w    w
                         Off-board Station Alarms: w    w
          On-board Trunk Alarms (Alarm Group 1): y    y
         Off-board Trunk Alarms (Alarm Group 1): w    w
          On-board Trunk Alarms (Alarm Group 2): w    w
         Off-board Trunk Alarms (Alarm Group 2): w    w
          On-board Trunk Alarms (Alarm Group 3): w    w
         Off-board Trunk Alarms (Alarm Group 3): w    w
          On-board Trunk Alarms (Alarm Group 4): w    w
         Off-board Trunk Alarms (Alarm Group 4): w    w
                   On-board Adjunct Link Alarms: w    w
                  Off-board Adjunct Link Alarms: w    w
                     Off-board MASI Link Alarms:      w
                           Off-board DS1 Alarms: w    w
                      Off-board PI-LINK Alarms: w    w
                      Off-board Alarms (Other): w    w
                    Off-board ATM Network Alarms:      w
```

Screen 6-26. Alarm reporting options—screen 1

Baselining the Customer's Configuration

A

Appendix A provides a worksheet for recording information about the customer's configuration. The kinds of information to baseline includes:

- ATM Switch Administration
- Interconnections
- DEFINITY Server Administration Worksheet

ATM Switch Administration

Refer to your Avaya ATM network switch's quick reference guide for more information.

Interconnections

Record the interconnection of fiber optic cabling on the LIU form (Figure A-1). Record the DEFINITY Server port network number below the ATM switch port in Table A-1 on page A-4.

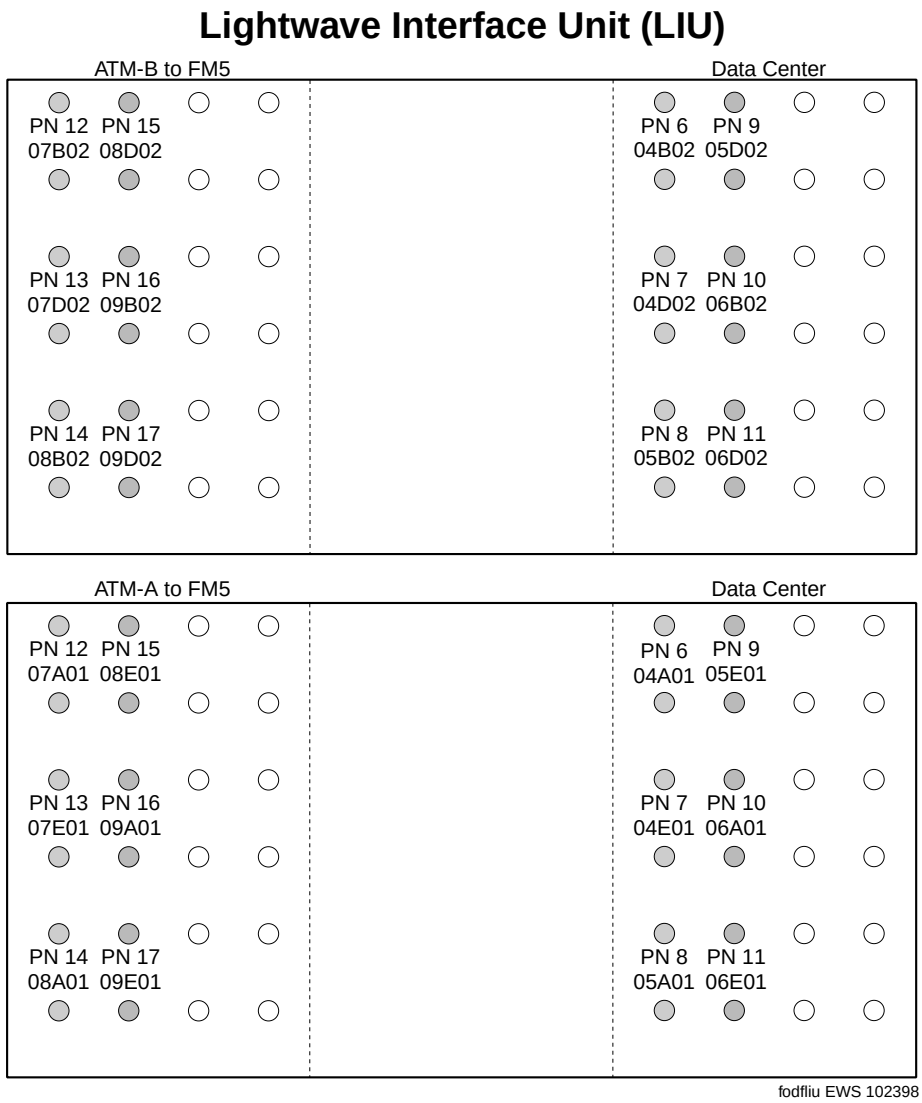

Figure A-1. Sample lightwave interface unit (LIU)

DEFINITY Server Administration Worksheet

Use the sample worksheet in this section to baseline the customer's ATM configuration for standard and high reliability systems (see Table A-1 on page A-4). Make copies as needed.

Be sure to leave this worksheet or a copy of it on site.

Customer Worksheet for Standard and High Reliability Systems

Avaya ATM switch address (26-digits):_____
ATM switch location:_____
DEFINITY Server switch location:_____

Table A-1. Customer configuration worksheet for standard and high reliability systems

ATM switch port	A-PNC				B-PNC			
	ATM-PNC number	DEFINITY location (UUCSS[1])	Name	ESI (MAC)[2] address last 12 digits	ATM-PNC number	DEFINITY location (UUCSS)	Name	ESI (MAC) address last 12 digits

Continued on next page

Table A-1. Customer configuration worksheet for standard and high reliability systems (Continued)

ATM switch port	A-PNC				B-PNC			
	ATM-PNC number	DEFINITY location (UUCSS[1])	Name	ESI (MAC)[2] address last 12 digits	ATM-PNC number	DEFINITY location (UUCSS)	Name	ESI (MAC) address last 12 digits

1. UUCSS stands for cabinet-carrier-slot.
2. Read from ATM switch console.

ATM Switch Feature Interactions

B

The interconnection of port networks across a wide area through multiple ATM switches may introduce delays in establishing some inter-port network connections. WAN interconnectivity can introduce some transmission delays.

The following topics are covered in this appendix.

- Location-related Interactions
- Features Supported
- Features Not Supported
- Delay Interactions
- ATM Feature Interactions
- Cross-product Compatibility

Location-related Interactions

Location-related problems happen in two areas:

- Switch operability
- Feature performance

Switch operability

The basic switch functions (Table B-1) are affected by location within the ATM application.

Table B-1. Switch operability interactions

Operation	Description
Station alerting	When a call is offered to a station, an inter-PN connection is initiated and the phone rings. This procedure applies to calls to stations, data modules, and attendant consoles. When the user answers, the station should be connected before the user says “hello.”
Trunk seizure	Trunk seizure happens after an outgoing call is submitted to an outgoing trunk port, followed by address outpulsing. Seizure and address outpulsing do not require an established talk path to the trunk. If the talk path to or from the trunk is delayed for several seconds and the call was dialed instantly through abbreviated dialing, some initial call progress feedback might be missed and, perhaps, some information from the answering party. Connection setup times of as much as 1-2 s can be covered by seizure/outpulsing, but longer setup times require postponing seizure until the inter-PN connection is established.
Recorded announcements	When an announcement is connected, it requests playback as soon as possible. The switch delays playing back an announcement until at least one inter-port-network connection, if needed, is established. The barge-in announcements, which the caller joins in progress, do not require this delay.

Feature performance

DEFINITY Server switch features are affected by location (Table B-2).

Table B-2. DEFINITY Server operations affected by location

Operation	Description	User interface	Performance
Time of Day	Administration of a time offset relative to the system clock permits the computation of local time for each port network. See "Time of Day considerations" for more information.	■ Time/date display and wakeup or do-not-disturb times displayed in local time. ■ Attendant service from a local attendant on local time. ■ User can dial local calls without supplying the area code (NANP only) or the country and/or city code (international), just as on a single-location switch. ■ Each location can have its own local emergency processing center, and 911 calls typically routed via ARS are sent to the local dispatch for each caller's location.	These added locations help solve: ■ Different public network dial plans for different locations affecting — 911 calls — home or foreign number plan area (US only) — international dialing or country codes ■ Different time zones on — user displays — CDR records — time-of-day routing
ARS Digit Analysis	ARS digit analysis (routing), digit conversion, and toll analysis can be administered with location-specific parameters in addition to "global" (ARS and public-network TAC calls).	If a location-specific entry and a global entry both match a dialed number equally well, then the location-specific entry takes precedence over the global entry, and a location-specific digit conversion takes precedence over a location-specific routing entry.	Multiple-location routing capacities = 4000 (Release 7 or later ACP software on DEFINITY Server R) A set of local routing options also are required for each location for ■ 911 ■ other service numbers ■ local operator access ■ local calls in general.

Continued on next page

Table B-2. DEFINITY Server operations affected by location (Continued)

Operation	Description	User interface	Performance
ARS Digit Conversion	■ Code Conversion When Foreign Number Plan Area (FNPA, 10-digit) or Home Number Plan Area (HNPA, 7-digit) numbers are converted, the home NPA used is determined from the originator's administered location. ■ Call Redirection Uses the location and partition group of the forwarded or covered party, not those of the caller.	To simplify the administration of AAR/ARS and its interaction with TOD routing and partition groups, partitioning should be separated from AAR and ARS analysis. In other words, AAR/ARS analysis entries could specify a routing index (from 1 to 2000), and a separate table could be used to specify the routing treatment for each of 8 partitions, for each routing index.	Maximum 600 conversion entries possible (Release 7r or later) Provides a fixed point of reference for digit analysis
Daylight Savings Time	Up to 15 starting and ending dates and times and the change increment (in hours and minutes) can be administered for different locations.	Each location must have a Daylight Savings Time rule administered.	Once administered, all locations change automatically to the proper time at the designated day and time.

Continued on next page

Table B-2. DEFINITY Server operations affected by location (Continued)

Operation	Description	User interface	Performance
Dial Plan	Users on port networks located in different North American Number Plan Areas (NPAs) expect to make local calls by dialing 7-digit numbers. Although the digits dialed by two different users may be the same, the actual intended destinations may be different.		Carefully consider AAR and ARS routing parameters in ATM configurations.
System clock	Time displays and stamps in all other locations automatically change according to the administered Daylight Savings Time rules.	Elapsed-time fields for features such as Call Detail Recording (CDR) are treated as they are now whenever the system clock is reset during the transition to and from daylight savings time. The system administrator may choose not to specify daylight savings time for the system clock, thereby avoiding the transitions. This may make time-of-day routing tables inaccurate. And, because the automatic daylight transition occurs early in the morning (at least by U.S. rules), only a few CDR records are affected.	With one administration change at the PPN, all remote locations display and timestamp in locally adjusted Daylight Savings Time.

Time of Day considerations

Table B-3 shows the time-of-day impacts on users and administrators. In the Group column:

- User-visible means that times are visible and/or manipulated by the users.
- System management means that times are visible to, used by, and set by the system administrator or other switch management.

Table B-3. Time of day impacts

Use	Group	Impact
User date and time	User-visible	The date and time displayed by the system should indicate the user's local time.
Automatic wakeup Announcements Do-Not-Disturb	User-visible	The user is able to specify and receive a wakeup call at the correct local time.
Call Detail Recording	System management	Times recorded may have to be matched against times reported by public network service providers (which may be dependent on the locations of trunk groups). Two kinds of changes: ■ Automatic changes are set in software to occur at 2 AM, for example. ■ Manual changes are still possible
Time-of-Day routing	System management	Times are derived from time-of-day considerations based on the location(s) of various outgoing trunks. For example, a time-of-day routing change may take place at 5:00 PM EST because calls entering the public network through a New York trunk group receive reduced rates. Another change may occur at 5:00 PM PST because trunks in Los Angeles now provide reduced rates. Some or all of these times may be subject to daylight savings time changes.
Malicious Call Trace	System management	Recorded time may need to be converted to user-perceived time. Because this feature is invoked infrequently, manual conversion is acceptable.
AUDIX	User-visible	AUDIX maintains its own time (including daylight savings) and is unaffected by switch administration. Depending on the number of DCS links available, it is possible to provide a different AUDIX switch for each time zone (or each location), with the AUDIX clock set to match.

Features Supported

Release 7 and later software supports the ATM-CES trunking features listed in Table B-4 with noted feature interactions. Other features are not listed because they have nothing to do with trunking.

Table B-4. Release 7 and later ATM-CES trunking features supported

Feature	Description
Abbreviated Dialing	Has the digits before cut-through put in the SETUP message. Tones after the cut-through (used by voice response systems) are generated directly by the ATM board.
Alternate Facility Restriction Levels	Works the same for ATM trunks as for any other trunk.
Attendant Serial Calling	Works the same as for other trunks.
Automatic Alternate Routing (AAR)	Selects a routing pattern, which in turn may select an ATM trunk.
Authorization Codes	Can override the FRL on incoming ATM calls or block access to ATM trunks.
Automatic Route Selection	Selects a routing pattern, which in turn may select an ATM trunk.
CallVisor Adjunct/Switch Applications Interface (ASAI)	Carries messages (customer account number, for example) in facilities information elements in Q.931 messages.[1]
Call Detail Recording	Applies to trunk groups, not to individual trunk members (same CDR format used for ISDN-PRI trunks)
CDR Account Code Dialing Forced Entry of Account Codes	Works with ARS, but not with TAC (ATM trunk groups *do not* support TAC).
Class of Restriction (COR)	Is used for miscellaneous trunk restrictions: CORs assigned to individual stations control access to ATM trunks through the routing table FRL.
Clock/Synchronization	Derives synchronization source from T1 or E1 span connected to the ATM switch(es).
Data Call Setup Data Hot Line Data Privacy Data Restriction	Sets the QoS parameters appropriately for data calls.
DCS Over ISDN-PRI D-Channel (DCS+)	Is supported
End-to-End Signaling	Send DTMF digits for rotary phones *after* the call is connected.
Extended Trunk Access (ETA)	Routes a call to a trunk

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Table B-4. Release 7 and later ATM-CES trunking features supported (Continued)

Feature	Description
Facility Restriction Levels (FRLs)	Control access to ATM trunks like any other trunk. See also Traveling Class Marks (TCM).
Facility Associated Signaling (NFAS)	Is supported by DEFINITY Server ATM.
Nonfacility Associated Signaling (NFAS)	Is not supported (see NFAS in the list of unsupported features).
Generalized Route Selection (GRS)	Includes Bearer Capability Class (BCC), Information Transfer Capability (ITC), and others. These parameters are checked on the routing pattern, and are used to select an appropriate trunk group. These parameters may help choose the appropriate QoS.
Inbound Call Management (ICM)	See CallVisor ASAI.
Inter-PBX Attendant Calls	Does not require a special kind of trunk, unlike Centralized Attendant Service (CAS).
Look Ahead Interflow	Places look ahead interflow information element in the SETUP message, requiring a private network connection.
Malicious Call Trace (MCT)	Shows calling party identification and port number. MCT cannot be activated on a specific ATM trunk port, as can be done on ISDN ports.
Multiple Listed Directory Numbers	Work with CO, DID, FX, ISDN-PRI, and ATM trunks.
Network Access—Private	Works same as any other tie trunk
Network Access—Public	Works same as an ISDN-PRI trunk to the public network
Night Service	Is supported for all night service modes, including the ability to administer an individual night service button to an ATM group. It is *not* possible to have a night service extension assigned to an individual trunk group member (for other than CES).
QSIG Global Networking	Is supported
Remote Access (with Security Measures)	Uses remote access features for incoming calls on ATM trunks, including barrier codes and authorization codes.
Remote Call Coverage	Is supported to an endpoint over ATM, with the limitation that the ATM trunk cannot be selected by a TAC.
Restriction—Fully Restricted Service	Restricts stations to certain ATM trunks
Restriction—Toll	Uses the ARS toll table for ATM trunking

Continued on next page

Table B-4. Release 7 and later ATM-CES trunking features supported (Continued)

Feature	Description
Restriction—Voice Terminal, Inward	Restricts stations to receive ATM private network calls but not ATM public network calls.
Restriction—Voice Terminal, Outward	Restricts stations to originate ATM private network calls but not ATM public network calls.
Restriction—Voice Terminal, Public	Restricts stations to receive ATM private network calls but not ATM public network calls.
Ringback Queuing	Queues Callbacks for any ATM trunk not used for DCS (same as ISDN-PRI restriction).
Subnet Trunking	Supports subnet trunking over ATM with normal digit manipulation.
Synchronization	See Clock Synchronization
System Measurements	Includes ATM-related measurements
System Status Report	Monitors trunk group traffic
Timed Reminder and Attendant Timers	Routes an incoming ATM call to the attendant if it is unanswered for a specified time period.
Transfer—Outgoing Trunk to Outgoing Trunk (with Security Measures)	Allows a station user to connect an ATM trunk to another trunk (ATM or not).
Traveling Class Marks (TCM)	Work as with ISDN-PRI.
Trunk Identification By Attendant	Are identifiable by group and member.
Wideband Switching	Is supported in ATM trunks and in ATM-PNC but in limited numbers.

1. The adjunct requests that these messages be sent along with the call when it routes over the trunk.

Features Not Supported

None of the features listed below are supported in DEFINITY Server ATM CES trunks in Release 7 or later Avaya Call Processing (ACP) software.

- Abandoned Call Search
- Access Endpoint
- Administered Connections
- Advice of Charge (AOC)
- Answer Detection
- Attendant Control of Trunk Group Access
- Attendant Direct Trunk Group Selection
- Automatic Circuit Assurance (ACA).
- Automatic Transmission Measurement System (ATMS)
- Busy Verification of Trunks
- Call-by-Call Service Selection
- Centralized Attendant Service (CAS)
- Data-Only Off-Premises Extensions
- DCS Attendant Control of Trunk Group Access
- DCS Attendant Direct Trunk Group Selection
- DCS Automatic Circuit Assurance (ACA)
- DCS Busy Verification of Terminals and Trunks
- DCS Trunk Group Busy/Warning Indication
- Digital Multiplexed Interface Plan
- Direct Inward and Outward Dialing (DIOD)—International
- Direct Outward Dialing (DOD)
- DS1 Trunk Service
- E1 Trunk Service
- Enhanced ICSU
- Enhanced DCS (EDCS)
- Facility Busy Indication
- Facility Test Calls (with Security Measures)
- Flexible Billing
- Integrated Services Digital Network (ISDN)—Primary Rate Interface
- Loudspeaker Paging Access and Loudspeaker Paging Access—Deluxe

- Nonfacility Associated Signaling (NFAS)
- Off-Premises Station
- Personal Central Office Line (PCOL)
- Power Failure Transfer
- R2-MFC Signaling
- Recorded Announcement
- Recorded Telephone Dictation Access
- Restriction—Miscellaneous Trunk
- Trunk Flash
- Trunk Group Busy/Warning Indication

Delay Interactions

Delays in ATM cell delivery affects the ATM-PNC or ATM-CES features and functionality listed in Table B-5.

Additionally, WAN-PNC configurations (more than one ATM switch) require additional delay considerations:

1. Setting up an SVC through the PNC can be delayed by as much as 7 s, similar to an ISDN trunk.
2. An SVC request can fail, and this failure may not be received for several seconds.
3. Paths through the PNC are not free (however, tariffing of these resources is highly variable).

Table B-5. ATM delay interactions

Feature	Description
POTS (plain old telephone service)	Lets in normal point-to-point calls the terminating side does not ring until an SVC is established through the WAN.
AAR (Automatic Alternate Routing) ARS (Automatic Route Selection)	Route calls based on the preferred (normally the least expensive) route available at the time the call is placed.
AAR and ARS Overlap Sending	Determines that if the call is to be routed to another switch over a trunk with ISDN overlap sending, the system seizes the outgoing ISDN trunk and starts sending digits while the DEFINITY Server continues to collect (receive) the remaining incoming digits.

Continued on next page

Table B-5. ATM delay interactions (Continued)

Feature	Description
AAR and ARS Partitioning	Manages geographically dispersed EPNs.
Agent Call Handling	Allows you to administer functions that Automatic Call Distribution (ACD) agents use to answer and process ACD calls. Automatic answering (zip tone) calls are also affected by SVC setup delays and failures.
Alternate Operations Support System Alarm Number (OSSA)	Allows you to establish a second number for the switch to call when an alarmable event occurs. This feature is affected by SVC setup delays and failures.
Answer Detection	Detects when the called party answers a call for call-detail recording. If the customer provisions Answer Supervision by Time-out, then calls are affected by SVC setup delays and failures.
Attendant Auto-Manual Splitting	Allows the attendant to announce a call or consult privately with the called party without being heard by the calling party on the call. This feature is affected by SVC setup delays and failures.
Attendant Backup Alerting	Allows other system users to pick up attendant calls when the attendant is unable to do so. This feature provides both audible and visual alerting to backup stations when the attendant queue reaches its queue warning level. When the queue drops below the queue warning level, alerting stops. This feature is affected by SVC setup delays and failures for the calls that are picked up by other system users.
Attendant Direct Trunk Group Selection	Allows the attendant to access an idle outgoing trunk. This feature is affected by SVC setup delays and failures if trunk is on another EPN.
Attendant Intrusion	Allows an attendant to intrude on an existing call to offer a new call or message to the intruded party. This feature is affected by SVC setup delays and failures.
Attendant Override of Diversion Features	Allows an attendant to bypass call-diversion features invoked by and associated with a dialed extension. This feature is affected by SVC setup delays and failures.
Attendant Recall	Allows voice-terminal users on a 2-party call or on an attendant conference call held on the console to recall the attendant for assistance. This feature is affected by SVC setup delays and failures.
Attendant Serial Calling	Enables the attendant to transfer trunk calls that return to the same attendant after the called party hangs up. This feature is affected by SVC setup delays and failures.
Audio Information Exchange (AUDIX) Interface	Is affected by SVC setup delays and failures.
Auto Start and Don't Split	Allows the attendant to initiate a call by pressing any key on the keypad without having to first press Start. No effect.

Continued on next page

Table B-5. ATM delay interactions (Continued)

Feature	Description
Automatic Call Distribution (ACD	Allows incoming calls to connect automatically to specific splits. This feature is affected by SVC setup delays and failures.
Automatic Callback (ACB)	Allows internal users who placed a call to a busy or unanswered internal voice terminal to be called back automatically when the called voice terminal becomes available. This feature is affected by SVC setup delays and failures.
Automatic Incoming Call Display	Allows the system to provide information about an incoming call when the called party is active on a call. This feature is affected by SVC setup delays and failures.
Automatic Transmission Measurement System (ATMS)	Measures transmission performance for voice and data trunk facilities. This is affected by ATM-WAN problems.
Automatic Wakeup	Allows attendants, front desk users, and guests to place an automatic wakeup call to a certain extension at a later time. This feature is affected by SVC setup delays and failures.
Bridged Call Appearance	Allows single-line and multi-appearance voice-terminal users to have an appearance of another user's primary extension number. This feature is affected by SVC setup delays and failures.
Busy Verification of Terminals and Trunks	Allows attendants and specified multi-appearance voice-terminal users to make test calls to trunks, voice terminals, and hunt DDC and UCD groups.This feature is affected by SVC setup delays and failures.
Call Coverage	Provides automatic redirection of calls to alternate answering positions in a Call Coverage path. This feature is affected by SVC setup delays and failures.
Call Detail Recording (CDR)	Collects detailed information about all incoming and outgoing calls on specified trunk groups and, if you use intraswitch CDR, about calls between designated extensions on the switch. No effect.
Call Forwarding	Allows users to redirect calls to designated destinations. The feature is affected by SVC setup delays and failures.
Call Park	Allows users to put a call on hold and then retrieve the call from any other voice terminal within the system. This feature is affected by SVC setup delays and failures.
Call Pickup	Allows a voice-terminal user to answer calls that alert other extension numbers within the user's specified call pickup group. This feature is affected by SVC setup delays and failures.
Call Prompting	Uses specialized vector commands to process incoming calls based on information collected from the caller or from an ISDN-PRI message. This feature is affected by SVC setup delays and failures.

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Table B-5. ATM delay interactions (Continued)

Feature	Description
Call Vectoring	Processes incoming and internal calls according to a programmed set of commands. This feature is affected by SVC setup delays and failures.
Call Waiting Termination	Notifies a user with a single-line telephone who is active on one call that a second call is waiting. This feature is affected by SVC setup delays and failures.
Centralized Attendant Service (CAS)	Allows attendants in a private network of switching systems to be concentrated at a central or main location. Attendant answer times are affected by delays and failures.
Code Calling Access	Allows attendants, voice-terminal users, and tie-trunk users to page with coded chime signals. This feature is affected by SVC setup delays and failures.
Conference Attendant	Allows the attendant to set up a conference call for as many as 6 conferees, including the attendant. This feature is affected by SVC setup delays and failures.
Conference Terminal	Allows multi-appearance voice-terminal users to make 6-party conference calls without attendant assistance. This feature is affected by SVC setup delays and failures.
Consult	Allows a covering user, after answering a coverage call, to call the principal (called party) for private consultation. This feature is affected by SVC setup delays and failures.

Continued on next page

Table B-5. ATM delay interactions (Continued)

Feature	Description
DCS Alphanumeric Display for Terminals	Allows calls to or from alphanumeric-display terminals to have transparency for call-related data. No impact for all of DCS features. ■ DCS Attendant Control of Trunk Group Access ■ DCS Attendant Direct Trunk Group Selection ■ DCS Attendant Display ■ DCS Automatic Callback ■ DCS Automatic Circuit Assurance ■ DCS Busy Verification of Terminals and Trunks ■ DCS Call Coverage ■ DCS Call Forwarding ■ DCS Call Waiting ■ DCS Distinctive Ringing ■ DCS Leave Word Calling ■ DCS Multiappearance Conference/Transfer ■ DCS Over ISDN-PRI D-channel ■ DCS Trunk Group Busy/Warning Indication
Do Not Disturb	Allows guests, attendants, and authorized front-desk voice-terminal users (those with console permission) to request that no calls, other than priority calls, terminate at a particular extension until a specified time. Affected by Time-of-Day issues.
Emergency Access to the Attendant	Alerts an attendant if a station remains off-hook for more than the administered period of time. This feature is affected by SVC setup delays and failures.
Expert Agent Selection	Routes incoming Automatic Call Distribution (ACD) calls to the agent best qualified to handle the call.This feature is affected by SVC setup delays and failures.
Facility Test Calls	Allows you to test specific trunks, DTMF receivers, time slots, and system tones from a phone. This feature is affected by SVC setup delays and failures.
Generalized Route Selection	Provides voice and data call-routing capabilities. This may be used for routing to EPNs when knowledge of the WAN behavior is available.
Go to Cover	Allows users who call another internal extension to send the call directly to coverage. This feature is affected by SVC setup delays and failures.
Group Paging -	Allows a user to make announcements to groups of stations. This feature is affected by SVC setup delays and failures.

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Table B-5. ATM delay interactions (Continued)

Feature	Description
Hot Line Service	Allows single-line voice terminal users, by simply lifting the handset, to automatically place a call to a preassigned destination (extension, public or private network telephone number, or feature access code). This feature is affected by SVC setup delays and failures.
Hunt Groups	Handle multiple calls simultaneously to a single phone number. This feature is affected by SVC setup delays and failures.
Inbound Call Management	Allows you to integrate features of a DEFINITY Server with host-application processing and routing, and automate delivery of caller information to agents' displays. This feature is affected by SVC setup delays and failures.
Intercept Treatment	Provides an intercept tone or a recorded announcement or routes the call to an attendant for assistance when calls cannot be completed or when use of a feature is denied. This feature is affected by SVC setup delays and failures.
Intercom Automatic	Provides a talking path between two voice-terminal users. This feature is affected by SVC setup delays and failures.
Intercom Dial	Allows multiappearance voice-terminal users to gain rapid access to other voice-terminal users within an administered group.This feature is affected by SVC setup delays and failures.
Internal Automatic Answer	Provides convenient hands-free answering of internal calls to some voice-terminal users on most multifunction stations with a speakerphone or a headphone. This feature is affected by SVC setup delays and failures.
Inter-PBX Attendant Service (IAS)	Allows attendants for multiple branches to be concentrated at a main location. Incoming trunk calls to the branch, as well as attendant-seeking voice-terminal calls, route over tie trunks to the main location. This feature may be affected by SVC setup delays and failures.
Intraflow and Interflow	Allows you to redirect ACD calls from one split to another split when the splits are not vector-controlled. This feature is affected by SVC setup delays and failures.
Look-Ahead Routing	Provides an efficient way to use trunking facilities. This feature is affected by SVC setup delays and failures.
Loudspeaker Paging Access	Loudspeaker Paging Access provides attendants and voice-terminal users dial access to voice-paging equipment. This feature is affected by SVC setup delays and failures.
Malicious Call Trace	Allows you to trace malicious calls. No effect.
Manual Message Waiting	Enables multi-appearance voice-terminal users to press a designated button on their own terminals and light the Manual Message Waiting button lamp at another multi-appearance voice terminal. No effect.

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Table B-5. ATM delay interactions (Continued)

Feature	Description
Manual Originating Line Service	Connects single-line voice-terminal users to the attendant automatically when a user lifts the handset. This feature is affected by SVC setup delays and failures.
Messaging Server Interface	Messaging Server (MS) interface provides MS-based features to the system. This feature is affected by SVC setup delays and failures.
Multimedia Call Handling (MMCH)	Allows you to administer a non-BRI voice terminal and a multimedia endpoint as a multimedia complex. This feature is affected by SVC setup delays and failures.
Multiple Call Handling (MCH)	Allows agents to receive an ACD call while other types of calls are alerting, active, or on hold. This feature is affected by SVC setup delays and failures.
Music-on-Hold Access	Automatically provides music, silence, or tone to a caller. This feature is affected by SVC setup delays and failures.
Night Service	Same as other hunt group and trunk features.
PC Interface	Is part of the PC/PBX connection, the PC/PBX platforms, and PC/ISDN platform product family. None of these features are affected.
Property Management System Interface	Provides a communications link between the switch and a customer-owned PMS. Interface to PMS system is affected by SVC setup delays and failures.
Public Network Call Priority	Provides call retention, forced disconnect, intrusion, mode-of-release control, and rering to switches on public networks. No effect.
QSIG	Provides compliance to the ISO ISDN private-networking specifications. Similar effect as DCS ■ QSIG Call Forwarding (Diversion) ■ QSIG Call Transfer ■ QSIG Name and Number Identification ■ QSIG Path Replacement (ANF-PR) ■ QSIG Transit Counter (ANF-TC)
Recall Signaling	Allows the user of an analog station to place a call on hold, use the voice terminal for other call purposes, and then return to the original call. This feature is affected by SVC setup delays and failures.
Recorded Announcement	Provides an announcement to callers under a variety of circumstances. This feature is affected by SVC setup delays and failures.
Recorded Telephone Dictation Access	Permits voice-terminal users, including Remote Access and incoming tie-trunk users, to access dictation equipment. No effect if user waits for signal.

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Table B-5. ATM delay interactions (Continued)

Feature	Description
Redirection on No Answer	Redirects a ringing ACD split or skill call or Direct Agent Call after an administered number of rings. It will have an effect if WAN-PNC delays ringing.
Ringback Queuing	Places outgoing calls in an ordered queue (first-in, first-out) when all trunks are busy. The voice-terminal user is automatically called back when a trunk becomes available. This feature is affected by SVC setup delays and failures.
Send All Calls	Allows users to temporarily direct all incoming calls to coverage regardless of the assigned call-coverage redirection criteria. The forwarded phone is affected by delays.
Service Observing	Allows a specified user, such as a supervisor, to observe or monitor another user's calls. No effect.
Station Hunting	Routes calls made to a busy station down a chain of stations until one is found that is not active. This feature is affected by SVC setup delays and failures.
Temporary Bridged Appearance	Allows multi-appearance voice terminal users in a terminating extension group (TEG) or personal central office line (PCOL) group to bridge onto an existing group call. This feature is affected by SVC setup delays and failures.
Terminating Extension Group	Allows an incoming call to ring as many as 4 voice terminals at one time. This feature is affected by SVC setup delays and failures.
Time of Day Routing	Provides the most economical routing of ARS and AAR calls. This feature is affected by different time zones.
Transfer	Allows voice-terminal users to transfer trunk or internal calls to other voice terminals or trunks without attendant assistance. This feature is affected by SVC setup delays and failures.
Transfer Outgoing Trunk to Outgoing Trunk	Permits a controlling party (such as a station user or attendant) to initiate two or more outgoing trunk calls and then connect the trunks. This feature is affected by SVC setup delays and failures.
Trunk-to-Trunk Transfer	Allows the attendant or voice-terminal user to connect an incoming trunk call to an outgoing trunk. This feature is affected by SVC setup delays and failures.
Uniform Dial Plan	Provides a common 4- or 5-digit dial plan (specified in the Dial Plan Record) that can be shared among a group of switches. No effect.
VDN in a Coverage Path	Enhances Call Coverage and Call Vectoring to allow you to assign Vector Directory Numbers (VDNs) as the last point in coverage paths. This feature is affected by SVC setup delays and failures.

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Table B-5. ATM delay interactions (Continued)

Feature	Description
VDN of Origin Announcement	Provides agents with a short message about a caller's city of origin or requested service based on the VDN used to process the call. This feature is affected by SVC setup delays and failures.
Visually Impaired Attendant Service	Allows a visually impaired attendant to listen to voiced information about each button in Inspect mode. This feature is affected by SVC setup delays and failures.
Voice Response Integration	Integrates Call Vectoring with the capabilities of voice response units (VRUs) such as the CONVERSANT Voice Information System (CVIS). This feature is affected by SVC setup delays and failures.
Whisper Page	Allows station users to make and receive barge-in announcements to and from other station users without anyone else on the calls being aware of the announcements. This feature is affected by SVC setup delays and failures.
Wideband Switching	Provides the ability to dedicate 2 or more ISDN-PRI B-channels or DS0 endpoints for applications that require large bandwidth. This feature is affected by SVC setup delays and failures.
World-Class Tone Detection	Allows DEFINITY Server to identify and handle different types of call-progress tones. Affected by delays and failures if the call needs to go to another EPN for the tone detector.
World-Class Tone Generation	Allows you to define call-progress tones. Affected by delays and failures if the call needs to go to another EPN for the tone generator.

ATM Feature Interactions

The following sections summarize the effects of ATM-WAN PNC on various features because of:

1. Location assignments in a widely distributed switch
2. Cell delivery delays and race conditions that occur on the ATM-WAN.

The features affected by these conditions are listed in Table B-6.

Table B-6. Release 7 or later ATM feature interactions

Feature	Affected by: Location	Affected by: Race Condition	Description	Remedy
Music on Hold	X		Long holding times between widely separated PNs (single music source extended to the PNs while caller is on hold).	Administer a separate music source for each location.
Tenant Partitioning Attendant Selection	X		Attendant services based on time of day at the administered location	Specify an attendant group for the partition (optional; overrides the location-based administration)
AAR/ARS Partioning	X[1]		Partitioning is applied in a partition routing table as the result of digit analysis.	AAR/ARS partitioning separated from digit analysis to: ■ simplify AAR/ARS administration ■ permit ARS caller-location analysis
Attendant Group Features Centralized Attendant Service	X		When a CAS attendant extends a call out over public facilities through TAC or ARS access, digit analysis is based on the location of the RLT trunk. That is, CAS attendants must dial as if they were on the served switch in the same location as the RLT trunk.	Combine switches in different locations to provide direct access to a single attendant group Centralized attendant service is acquired from another switch through an RLT trunk

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Table B-6. Release 7 or later ATM feature interactions (Continued)

Feature	Affected by: Location	Affected by: Race Condition	Description	Remedy
AUDIX	X	X	If a call goes to AUDIX, and the assigned AUDIX is far across the WAN, a race condition can exist between alerting with answer by AUDIX, and establishment of an inter-port-network connection through the ATM WAN. If the WAN loses, the AUDIX announcement could be clipped or lost.	Avoid this problem by providing local AUDIX systems, each located near its subscriber. If the switch spans multiple time zones, a separate AUDIX for each time zone is also desirable to provide the correct timestamps for recorded messages.
Automatic Call Distribution (ACD)	X		ATM WAN PNC permits the administration of a single ACD group with agents scattered across the country. Depending on the service provided by the WAN, this can lead to relatively long interconnection delays if, for example, an ACD customer calls in on a New York trunk and is routed to an agent on a port network located in Los Angeles.	Ensure that the ATM network used can meet interconnection delay requirements. This may require the use of local ATM switches interconnected through dedicated long-haul facilities.The switch cannot guarantee, in the worst case, that a talk path is available when the agent is alerted to the call and begins speaking. This remedy is necessary if a switch is to support ACD groups with access points in remote locations.
Automatic Route Selection (ARS)	X		The multilocation feature provides the ability to perform ARS digit conversion and routing analysis based on location. That is, the switch can support local public network dialing plans as appropriate for users in each location.	Convert this capability to ARS and apply it to UDP or AAR calls.
Call Coverage	X		When a call is sent to remote coverage, digit analysis and routing are based on the location, tenant number, and partition group of the covered user, not on those of the calling user. When the attendant is specified as a coverage point, the attendant group selected is based on the location (or tenant partition) of the covered user.	

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Table B-6. Release 7 or later ATM feature interactions (Continued)

Feature	Affected by: Location	Affected by: Race Condition	Description	Remedy
Call Forwarding	X		When call forwarding is activated and a call is actually forwarded, the forward-to digits are analyzed, and the call is routed, according to the location, tenant partition, and partition group assigned to the forwarded endpoint, not according to the caller's properties and permissions.	
CAMA trunks	X		Enhanced 911 (E911) service over CAMA trunks (MF signalling through a TN744D or TN2182B port) uses an algorithm that searches for a touch-tone receiver within a single location before searching elsewhere. This ensures that an E911 call uses a tone generator within the same location as the trunk and should not negatively impact E911 service on a WAN PNC configuration.	Engineer the service circuits and port networks within a location as if they were a stand-alone switch, which reduces reliance on service circuits located on distant port networks and minimizes long-haul ATM connections just for services like touchtone collection.
Dial Plan	X		The ATM-WAN PNC switch's dial plan has a common extension numbering and common feature access codes. Take care in planning to: ■ Combine existing switches ■ Add DID trunks and number ranges in different locations.	Administer multiple NANP home area codes (one per location) when using subnet trunking. See AAR and ARS changes.
Hospitality Automatic Wakeup	X		When guests and attendants enter or check wakeup times, all times are reported in that location's timezone and daylight savings time plan.	Time-zone and daylight savings time administration
Interexchange Carrier (IXC) access	X		You can administer IXC access codes across all locations in a WAN PNC.	
International	X		Restricted to a single country code	No provision has been made for location-based selection of companding modes, call progress tones, loss plans, or other options.
Paging	X		Switch capacity is 9 individual zones and a tenth (global) zone	

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Table B-6. Release 7 or later ATM feature interactions (Continued)

Feature	Affected by: Location	Affected by: Race Condition	Description	Remedy
Modem Pooling	X		Delayed connections to and through a modem pool can lead to failed modem training sequences.	Modern modems are more than twice as fast as the fastest modems supported by a modem pool.
Multimedia			The multimedia feature builds a conference using MMIs and VCs in a single port network to minimize the number of timeslots. This means that long-haul connections carry H.320 encoded digital data.	Send all data conferencing connections to the one ESM (24 connections per ESM) the switch supports.
Music on Hold	X		Placing music on hold to all port networks requires extending a music timeslot to any PN that needs it, resulting in long-haul music links between PNs if endpoints in different locations are on hold.	Use tenant partitioning to segregate music sources to individual locations.
Network access (public)	X		ARS permits location-based digit analysis and manipulation, including support for local dialling plans, local central office access, and the WAN PNC equivalent of tail-end hopoff (routing a call to the best central office access point through the ATM WAN).	
Network access (private)				
Network (SDN)	X		WAN PNC supports SDN access.	Replace the SDN with a WAN PNC switch.
Personal CO line			You can administer a personal CO line in a different city than the user.	
Recorded Announcement	X	X	Announcement playback may be delayed during inter-PN connection setup to ensure that the complete announcement can be heard.	
Remote modules			Multilocation feature supports any type of remote EPN (including DS-1)	
Tenant Partitioning	X		WAN PNC tenant partitioning can provide local music-on-hold sources and/or local attendants. XREF to Music on Hold above.	

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Table B-6. Release 7 or later ATM feature interactions (Continued)

Feature	Affected by: Location	Affected by: Race Condition	Description	Remedy
Ten-Digit to Seven-Digit Conversion	X		Supports 10-to-7 digit conversion by providing location-dependent routing and location-dependent home-NPA definition.	
Time-of-Day Routing	X		The system clock, which determines time-of-day routing transitions, permits administration of a daylight savings time rule, if desired.	System clock (if administered), changes automatically according to the specified rule, and time-of-day changes follow the system clock.
Uniform Dial Plan	X			Uniform Dial Plan in a network of switches makes it easier to merge those switches into a single WAN PNC switch.
Voice Terminal Display - Date/Time Display	X		Some phones maintain an internal time that is not synchronized with the switch, and must be set by the user.	Base correct date and time display on the user's location if location is administered.
World Class Routing (Multinational Call Routing/AAR-ARS)	X		Location-dependent digit analysis and conversion for ARS	

1. If a customer does not use AAR/ARS partitioning (or time-of-day routing), then the partition-routing table is not used at all, and route patterns are administered directly in AAR/ARS analysis entries.

Cross-product Compatibility

Observe the following cross-product compatibility issues:

Table B-7. Cross-product compatibility with DEFINITY Server ATM

Product	Description
AUDIX	For the caller to hear the complete AUDIX greeting message, the connection between the caller and AUDIX must be available immediately after AUDIX answers a call.
Conversant	Similar to the considerations for AUDIX, there must be an available talk path between the caller and the Conversant so that the caller hears prompts from the Conversant.

Glossary and Abbreviations

Numerics

800 service
A service in the United States that allows incoming calls from certain areas to an assigned number for a flat-rate charge based on usage

A

AAR
Automatic Alternate Routing—digit analysis performed in support of the private network numbering plan(s).

AC
Access Concentrator

ACD
Automatic Call Distribution

AFI
Address Format Identifier

AIS
Alarm Indication (or Inhibit) Signal—inserted when a network element receives a “bad” signal, and forwarded downstream to tell the receivers what happened.

ARS
Automatic Route Selection—digit analysis performed in support of the public network numbering plan(s)

ATM
Asynchronous Transfer Mode

ATM network duplication
ATM network duplication is an ATM-PNC configuration that allows DEFINITY ECS’s without duplicated SPEs to be supported with duplicated EPN connectivity to other points on an ATM network. These points can be on separate ATM switches, the same ATM switch, or directly connected to an ATM-WAN. There is no difference in performance between ATM network duplication and critical reliability.

C

CBR
Constant bit rate—Digital information, such as video and digitized voice, that is represented by a continuous stream of bits. CBR traffic requires guaranteed throughput rates and service levels.

CES
Circuit Emulation Service—a connection over an ATM PVC-based network that provides end-to-end service, sometimes called virtual trunking. Conforms to CES ATM Forum VTOA-78 Interoperability Specifications (CES-IS).

CDV
Cell delay variation, which measures the allowable variance in delay between one cell and the next, expressed in fractions of a second. When emulating a circuit, CDV measurements allow the network to determine if cells are arriving too fast or too slow.

CMC
Compact Modular Cabinet

CSCC
Compact Single Carrier Cabinet

CSS
Center Stage Switch—the central interface between the processor port network (PPN) and the expansion port networks (EPN).

CSU
Channel service unit

D

DCS
Distributed Communication System

DS1
Digital Signal, Level 1—The 1.544 Mbps digital signal format defined for operation in the international digital hierarchy.

DSU
Data service unit

DTE
Data terminal equipment

E

EI
Expansion interface

EPN
Expansion port network

ESCC
Enhanced single-carrier cabinet

ESI
End System Identifier

E

FNPA
Foreign Number Plan Area—in the North American Numbering Plan, any area code other than the caller's own area code. An FNPA ARS call specifies a 10-digit address (optionally preceded by a '1' toll prefix), the first three digits of which specify the area code, or number plan area. In some locations (typically where area codes are overlaid), it is necessary to dial the NPA even for a local call.

H

HNPA
Home Number Plan Area—in the North American Numbering Plan, the caller's own area code. An HNPA ARS call is usually a 7-digit call (perhaps preceded by a '1' toll prefix) for which the local area code is implied. In some locations, HNPAs are overlaid (2 or more used in the same location), requiring 10-digit dialing; in effect, there is no HNPA for such locations.

HO-DSP
High-Order Domain Specific Part

I

ICSU
Integrated Channel Service Unit

ILMI
Integrated Layer Management Interface

INS
Avaya's Data Network Systems

ISDN
Integrated Services Digital Network

L

LAN
Local area network

LAPD
Link Access Protocol D-channel

LIU
Lightwave Interface Unit

LOS
Loss of signal

M

MAC
Media Access Control

MCC
Multicarrier cabinet

MDF
Main distribution frame

Meiners' algorithm
The Meiners' algorithm is a method to determine whether a switch can support a proposed set of port networks in a proposed switch. This algorithm is available to Avaya personnel as a calculator within a Microsoft Excel spreadsheet, accessible at http://info.dr.lucent.com/~meiners/atm.html .

N

NANP
North American Numbering Plan—the numbering plan used in the U.S., Canada, and the Caribbean, in which a number consists of a 3-digit area code plus a 7-digit "local" number (itself divided into a 3-digit office code and a 4-digit number).

NPA
Number Plan Area—the area identified by the area code of the North American Numbering Plan.

O

OC-3
SONET (Synchronous Optical Network) optical carrier level 3 (155.52 Mbit/s).

P

PCR
Peak cell rate

PN
Port network

PNC
Port Network Connectivity—an alternative to either the direct-connect or center stage switch configurations for connecting the processor port network (PPN) to one or more expansion port networks (EPNs).

PPN
Processor port network

PRI
IDSN primary rate interface

PSTN
Public switched telephone network

PVC
Permanent Virtual Circuit—a virtual circuit that provides the equivalent of a dedicated private line service over a packet switching network between two DTEs (the path between users is fixed). A PVC uses a fixed logical channel to maintain a permanent association between the DTEs. Once a PVC is defined, it requires no set-up operation before data is sent and no disconnect operation after data is sent. ATM-CES uses PVCs as the basis for the permanent connections, sometimes called virtual trunking.

Q

QoS
Quality of Service

R

RDI
Remote defect indication

S

SDH
Synchronous Digital Heirarchy—Used outside the United States, it's an ITU standard for transmission in synchronous optical networks.

SONET
Synchronous Optical NETwork—a family of optical transmission channels for speeds from about 45 Mbps to 2.4 Gbps and higher.

STM-1
Similar to OC-3 but used outside the United States.

Subnet Trunking
A feature permitting the manipulation of digits on outgoing AAR and ARS calls, based on the selected routing preference.

SVC
Switched Virtual Connection—a virtual link established through an ATM network; the basic building block of port network interconnectivity. Two SVCs, one in each direction, are required for a bi-directional talk path between two port networks in ATM-PNC configurations.

T

TAC
Trunk access code

TDM
Time-division multiplexing

TTR
Touch-tone receiver

U

UID
Call redirection

V

VC
Virtual circuit

VCI
Virtual channel identifier—a unique, numeric tag (16-bit field in cell header) that identifies every virtual channel across an ATM network

VDN
Vector directory number

Virtual Path Identifier (VPI)
The 8-bit field in the cell header that indicates the virtual path over which a cell is routed.

W

WAN
Wide-area network

WAN spare processor
A processor port network (PPN) that acts as a backup to the main PPN in case the ATM connections to and from the main PPN are severed.

WSP
WAN spare processor

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